ISSUE 187 NOVEMBER 2008

Better Homes and Gardens®

WOOD®

22 GREATEST SHOP TIPS EVER! p.62

Quick & Easy Nightstand

(and Matching Bed p.24)

plus

- Super-simple Router Table p.6
- Bow-front Display Case p.56
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- Precisely Cut Tapers Using Basic Jigs p.32
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- Make *ANY* Tablesaw Cut Accurately, Cleanly p.40

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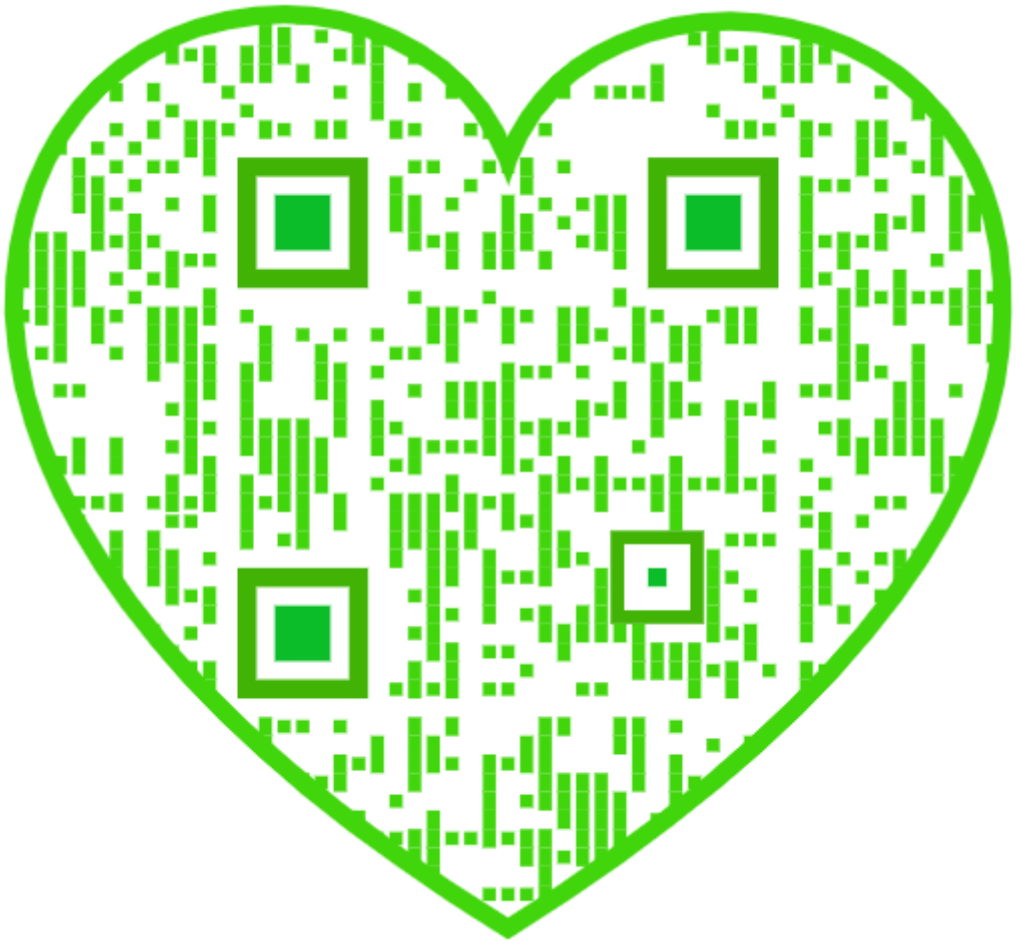


Grizzly Industrial®

Purveyors of Fine Machinery®

New! 10" Heavy-Duty Cabinet Table Saws *w/Riving Knife*

Perfect for cutting panels and wide stock!

- Motor: 3 HP, 220V, single-phase or 5 HP, 220V/440V*, 3-phase
- Precision ground cast iron table
- Table size w/extension: 27" x 75¾"
- Max. depth of cut: 3⅜" @ 90°, 2¼" @ 45°
- Arbor: ⅝"
- 52" rip capacity
- Approx. shipping weight: 514 lbs.

Riving Knife can be used with quick release guard!

EXTREME SERIES

*440V OPERATION REQUIRES PURCHASE OF ADDITIONAL COMPONENTS. CALL TECH. SERVICE FOR MORE INFO.

G0651 3 HP, single-phase
INTRODUCTORY PRICE $1695.00

G0652 5 HP, 3-phase
INTRODUCTORY PRICE $1695.00

Includes 10" Blade!
See it on Page 23 of the 2008 Catalog.

$139 Anywhere in Lower 48 States

New! Heavy-Duty 17" Extreme Bandsaw *w/ Cast Iron Wheels*

Only Grizzly offers these features for this price!

Cast Iron Wheels & Trunnion

MADE IN ISO 9001 FACTORY!

See it on Page 97 of the 2008 Catalog.

- Motor: 2 HP, 110V/220V, single-phase, TEFC
- Larger precision ground cast iron table size: 24" x 17"
- Table tilt: 5° left, 45° right
- Max. cutting height: 12"
- 2 blade speeds: 1700 & 3500 FPM
- Double ball bearing blade guides
- Quick change blade release/tensioner
- Approx. shipping weight: 414 lbs.

Includes Deluxe Re-saw Fence, Miter Gauge & ½" Blade

G0513X2
INTRODUCTORY PRICE $950.00

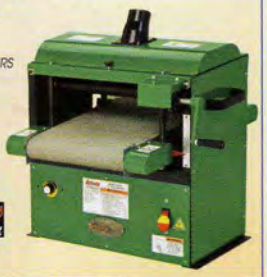
$89 Anywhere in Lower 48 States

12" Baby Drum Sander

- Sanding motor: 1½ HP, 110V, single-phase
- Conveyor motor: 1/10 HP, 110V, single-phase, variable speed 0-15 FPM
- Drum surface speed: 2300 FPM
- Max. stock dimensions: 12" wide x 3½" thick
- Min. stock length: 8"
- Sanding drum size: 4"
- Sanding belt: 3" hook & loop
- Approx. shipping weight: 160 lbs.

SIDE HANDLES FOR PORTABILITY!

2 ADJUSTABLE PRESSURE ROLLERS & INDUSTRIAL-DUTY BELT



G0459
ONLY $650.00

$69 Anywhere in Lower 48 States

10" Left-Tilting Table Saws *w/Cast Iron Router Table*

- Motor: 3 HP, 220V, single-phase or 5 HP, 220V, single-phase
- Precision ground cast iron table
- Table size w/wings attached: 27" x 48"
- Cutting capacity: 8" L, 26" R
- Approx. shipping weight: 500 lbs.

ROUTER AND WOOD NOT INCLUDED

G1023SLW
3 HP, single-phase
ONLY $1050.00

G1023SLWX
5 HP, single-phase
ONLY $1195.00

INCLUDES SHOP FOX® CLASSIC™ FENCE

$139 Anywhere in Lower 48 States

10" Left-Tilting Table Saw *w/7' Rails & Extension Table*

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table
- Extension table size: 27" x 44"
- Arbor: ⅝" (accepts dado blades up to 13/16")
- Cutting capacity: 8" L, 54" R
- Max. depth of cut: 3" @ 90°, 2⅛" @ 45°
- Approx. shipping weight: 532 lbs.

54" Cutting Capacity!

INCLUDES SHOP FOX® CLASSIC™ FENCE & CAST IRON MITER GAUGE

WOOD MAGAZINE TOP VALUE APPROVED 2003

G1023SLX ONLY $1295.00

$139 Anywhere in Lower 48 States

19" Heavy-Duty Extreme Series® Bandsaw

- Motor: 3 HP, 220V, single-phase, TEFC
- Precision ground cast iron table
- Table size: 26¾" x 19" x 1½"
- Cutting capacity/throat: 18¼"
- Max. cutting height: 12"
- Blade size: 143" L (⅛" - 1¼" wide)
- 2 Blade speeds: 1700, 3500 FPM
- Approx. shipping weight: 458 lbs.

Includes Aluminum Re-saw Fence Attachment, Dual Ball Bearing Blade Guides, Cast Iron Wheels & Fence

MADE IN ISO 9001 FACTORY!

EXTREME SERIES

G0514X
ONLY $1150.00

$89 Anywhere in Lower 48 States

21" Super Heavy-Duty Bandsaws *w/Tilting Geared Table*

- Motor: 3 HP or 5 HP, 220V, single-phase
- Precision ground cast iron table
- Table size: 29½" x 20¾" x 1⅞"
- Table tilt: 5° L, 45° R
- Cutting capacity/throat: 20"
- Max. cutting height: 14"
- Blade size: 165" long (¼" - 1⅜")
- Blade speed: 4600 FPM
- Approx. shipping weight: 684 lbs.

Includes 1" Blade, Cast Iron Wheels & Fence

G0566 3 HP
ONLY $1850.00

G0531 5 HP
ONLY $1895.00

$169 Anywhere in Lower 48 States

Professional Spindle Shapers

- Motor: 5 HP, 220V, single-phase, TEFC or 7½ HP, 220V/440V*, 3-phase
- Precision ground cast iron table size: 35½" x 28"
- Spindle sizes: ¾", 1" & 1¼" x 7½"
- Spindle speeds: 3600, 5100, 8000 & 10,000 RPM
- Spindle travel: 3¼"
- Max. cutter dia.: 5⅞"
- Approx. shipping weight: 602 lbs.

EXTREME SERIES

5 HP, SINGLE-PHASE
G5912Z ONLY $2195.00

7½ HP, 3-PHASE
G7214Z ONLY $2195.00

Includes Fence & Cast Iron Miter Gauge

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GRIZZLY INDUSTRIAL, INC. 1983 25th ANNIVERSARY 2008 MO • PA • WA

New! 15" Planer w/Spiral Cutterhead

An unbeatable combination of stability, power, smoothness & mobility!

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron tables & extension wings
- Table size: 15" x 20"
- Max. cutting height: 8"
- Feed rate: 16 & 30 FPM
- Cutterhead speed: 5000 RPM
- 2 speed gearbox
- Magnetic safety switch
- Heavy-duty cast iron construction
- Approx. shipping weight: 675 lbs.

Foot Operated Built-in Mobile Base Provides Versatile Positioning

G0453Z
INTRODUCTORY PRICE $1295.00

$139 ANYWHERE IN LOWER 48 STATES

See it on Page 57 of the 2008 Catalog.

New! 8" Jointer w/Spiral Cutterhead!

Versatile parallelogram table adjustment system!

- Motor: 3 HP, 220V, single-phase, TEFC
- Precision ground cast iron tables
- Total table size: 8" x 76⅜"
- Infeed table size: 8" x 43⅜"
- 4 row spiral cutterhead
- Cutterhead speed: 5350 RPM
- Max. rabbeting depth: ½"
- Deluxe cast iron fence size: 35"L x 1¼"W x 5"H
- Approx. shipping weight: 597 lbs.

Extra Long Infeed Table & Extra Tall Fence

INCLUDES FREE SAFETY PUSH BLOCKS

EXTREME SERIES

G0490X
INTRODUCTORY PRICE $1075.00

$139 ANYWHERE IN LOWER 48 STATES

See it on Page 41 of the 2008 Catalog.

20" Planer

- Motor: 5 HP, 220V, single-phase
- Table size: 20" x 25¾" (20" x 55⅝" w/ extension)
- Max. cutting width: 20"
- Max. cutting height: 8"
- Min. stock length: 7½"
- Max. cutting depth: ⅛"
- Feed rate: 16 FPM & 20 FPM
- Cutterhead dia.: 3⅛"
- Knives: 4 HSS
- Cutterhead speed: 5000 RPM
- Approx. shipping weight: 920 lbs.

Precision Ground Cast Iron Bed & Infeed/Outfeed Tables

G0454 ONLY $1295.00

$169 ANYWHERE IN LOWER 48 STATES

20" Extreme Series® Planer w/Spiral Cutterhead

- Motor: 5 HP, 220V, single-phase
- Precision ground cast iron table size: 20" x 25¾" (20" x 55⅞" w/ extension)
- Max. depth of cut: ⅛"
- Max cutting height: 8⅝"
- Cutterhead speed: 4800 RPM
- Feed rate: 16 & 20 FPM
- Approx. shipping weight: 909 lbs.

EXTREME SERIES

MADE IN ISO 9001 FACTORY!

G1033X ONLY $2395.00

$169 ANYWHERE IN LOWER 48 STATES

24" Professional Planers

- Cutterhead motor: 5 HP, 220V, single-phase or 7½ HP, 220V/440V*, 3-phase
- Feed motor: 2 HP
- Precision ground cast iron table size: 24⅛" x 31⅛"
- Max. cutting depth: ⅛"
- Max cutting height: 8"
- Feed rate: 17-26 FPM
- Cutterhead speed: 5200 RPM
- Knives: 4 HSS
- Approx. shipping weight: 1130 lbs.

Z SERIES

Variable Feed Speeds & Lever Adjustable Feed Rollers

*440V OPERATION REQUIRES PURCHASE OF ADDITIONAL COMPONENTS. CALL TECH. SERVICE FOR MORE INFO.

5 HP, SINGLE-PHASE
G5851Z ONLY $3795.00

7½ HP, 220V/440V*, 3-PHASE
G7213Z ONLY $3795.00

$250 ANYWHERE IN LOWER 48 STATES

12" x 83½" Parallelogram Jointer

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table size: 12¾" x 83½"
- Cutterhead knives: (4) 12" x ⅛" 19/64"
- Cutterhead dia.: 3¾"
- Cutterhead speed: 4950 RPM
- Max.depth of cut: ⅛"
- Max. rabbeting capacity: ¾"
- Approx. shipping wt: 1036 lbs.

INCLUDES FREE SAFETY PUSH BLOCKS

Handles Fold In For Added Safety

G0609
ONLY $1595.00

$250 ANYWHERE IN LOWER 48 STATES

10" Extreme Series® Jointers

- Motor: 3 HP, 220V, single-phase
- Precision ground cast iron table size: 11" x 84"
- Max. depth of cut: ⅛" • Rabbeting capacity: ½"
- Cutterhead speed: 5000 RPM
- Cutterhead dia.: 3⅛"
- Approx. shipping weight: 977 lbs.

Built Like a Tank w/ Heavy-Duty Cast Iron Base

4 BLADE CUTTERHEAD
G0455 ONLY $1695.00

SPIRAL CUTTERHEAD
G0480 ONLY $2095.00

$169 ANYWHERE IN LOWER 48 STATES

The Ultimate 12" Extreme Series® Jointers

- Motor: 3 HP, 220V, single-phase, TEFC
- Precision ground cast iron table size: 12½" x 80"
- Center mounted fence: 4¾" x 39¼"
- Max. depth of cut: 5/16" • Bevel jointing: 90° - 45°
- Cutterhead dia.: 4"
- Cutterhead speed: 5900 RPM
- Approx. shipping weight: 1253 lbs.

G9860 INCLUDES FREE H2404 JOINTER PAL® KNIFE SETTING JIG

EXTREME SERIES

MADE IN ISO 9001 FACTORY!

4 BLADE CUTTERHEAD
G9860 ONLY $3150.00

INCLUDES FREE SAFETY PUSH BLOCKS

SPIRAL CUTTERHEAD
G9860ZX ONLY $4150.00

$250 ANYWHERE IN LOWER 48 STATES

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in this issue

WOOD MAGAZINE SHOP TESTED APPROVED®

This seal is your assurance that we build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.

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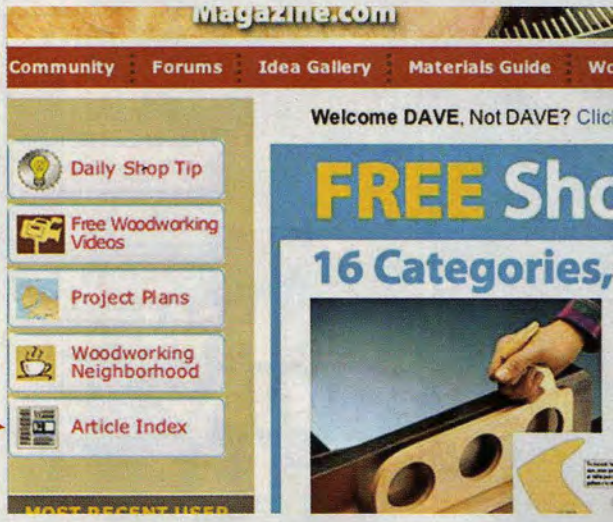
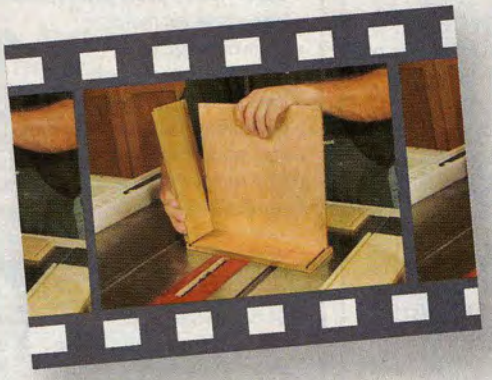


POST YOUR PRIDE AND JOY

Rob Rosano of Methuen, Mass., showed off these photos of his furniture-quality router table in the online photo gallery. Post photos of your own shop projects at woodmagazine.com/shopshots.



8 MINUTES TO SUPER-SIMPLE DRAWERS

That's all the time it takes to watch the free drawer-making seminar at woodmagazine.com/videos. Next time you're waiting for a glue-up to dry, pour a cup of coffee and watch this or other skill-building videos. It's like having *WOOD* magazine's experts in your shop.

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SHOP FOX®

19" HEAVY-DUTY BANDSAW

MADE IN AN ISO 9001 FACTORY!

- 2 HP, 110V/220V, single-phase, TEFC motor
- 19" x 26¾" precision ground cast iron table
- Table tilt: 10° L, 45° R
- 2 blade speeds: 1700 & 3500 FPM
- Cutting height: 12"
- Cast iron wheels
- Quick release blade tensioning

Includes ⅝" blade, fence and miter gauge

W1729

2 HP, 10" CONTRACTOR TYPE TABLE SAWS

- 2 HP, 110V/220V, single-phase motor
- Heavy-duty cast iron extension wings
- SHOP FOX® Alumina-Classic® Fence
- Cast iron miter gauge w/adjustable stops
- Rip capacity w/standard rails: 28½"
- Arbor: ⅝" ➤ Blade tilt: 45°R

MADE IN AN ISO 9001 FACTORY!

*110V Operation Requires Additional Purchases

Includes both standard & dado inserts

W1714 Right Tilt

W1726 Left Tilt

8" JOINTER *w/Parallelogram Adjustable Beds*

- 3 HP, 220V, single-phase, TEFC motor
- Precision ground cast iron parallelogram design table measures 8" x 76⅝"
- 4 knife, 5350 RPM cutterhead
- Rabbeting capacity: ⅝"
- Quick adjust levers
- Large center mounted cast iron fence

Internal Magnetic Safety Switch w/Thermal Protection

W1741

Built-in Mobile Base

SHOP FOX®

2½ HP SHAPER

- 2½ HP, 220V, single-phase motor
- Precision ground cast iron table measures 28" x 30"
- Spindle travel: 3"
- 2 spindle speeds: 7000 & 10,000 RPM
- Includes ½" & ¾" spindles and ¼" & ½" router bit collets
- Convenient pedestal controls

New

Split adjustment fence & fully adjustable cutter guard

W1763

Built-in Mobile Base

1 HP POWER FEEDER

New

- 1 HP, 220V motor
- 4 feed speeds: 13, 26, 33 & 66 FPM
- Vert. movement: 9"
- Horiz. movement: 17"
- Max. roller height: 7"
- Forward & reverse rotation

W1767

MADE IN AN ISO 9001 FACTORY!

1 HP POWER FEEDER *w/4 Rollers*

New

- 1 HP, 220V, single-phase motor
- 4 feed speeds: 13, 26, 36 & 72 FPM
- Vert. movement: 9½"
- Horiz. movement: 24¼"

W1768

MADE IN AN ISO 9001 FACTORY!

20" PLANER *w/Spiral Cutterhead*

- 5 HP, 220V, single-phase, TEFC motor
- Precision ground cast iron table measures 20" x 25¾"
- 2 feed speeds: 18 & 23 FPM
- 4 row spiral cutterhead w/carbide inserts
- Cutterhead speed: 5500 RPM
- Heavy-duty cast iron construction

MADE IN AN ISO 9001 FACTORY!

Magnetic Safety Switch w/Thermal Overload Protection

W1718

SHOP FOX®

HEAVY-DUTY MORTISING MACHINE *w/Stand*

- 1½ HP, 110V/220V, single-phase, TEFC motor
- Table size: 19" x 12½"
- Head tilts ±30°
- X & Y table movement
- Chisel capacity: ¼" - 1"
- Accepts ⅝", & ¾" collars
- Solid cast iron construction

Steel Cabinet Stand w/Indexed Storage Shelf for Mortising Chisels

W1743

37" DUAL DRUM SANDERS

- 10 HP, 220V, single-phase or 15 HP, 220V/440V*, 3-phase sanding drum motor
- ¼ HP conveyor motor
- Drum diameter: 6"
- Industrial rubber conveyor belt
- Variable conveyor feed rate: 6 - 18 FPM
- Control panel with amp load meter
- Max. stock dimensions: 36½" wide x 4" thick

New

*440V Operation Requires Additional Purchases

State-of-the-art Computer Balanced Dual Drums

10 HP, Single-Phase **W1772**

15 HP, 3-Phase **W1773**

3 HP CYCLONE DUST COLLECTOR

New

- 3 HP, 220V, single-phase, TEFC Class "F" motor
- 8" intake hole
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Includes steel stand & detailed instruction manual

W1809

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We asked our staff:

What's the favorite piece of furniture you've ever built?

My rendition of the Greene and Greene Ford house server in mahogany with ebony buttons and splines.

The first serious furniture project I built: a cherry crib for my son from *WOOD* magazine plans.

The window seat and bookcases in my wife's studio.

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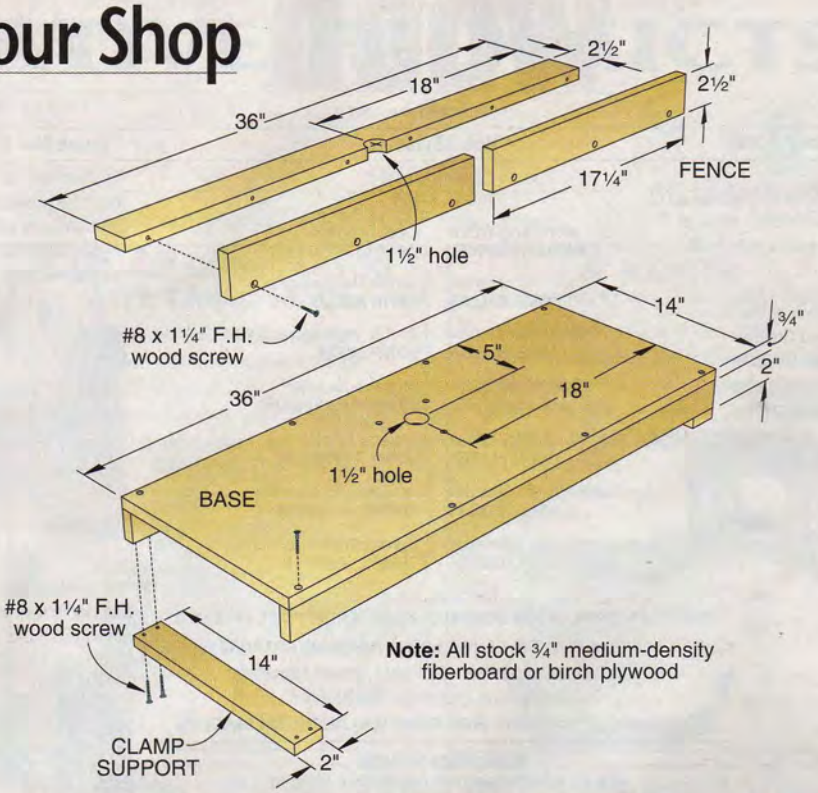
Portable Router Table

Here's your low-cost ticket to accurate, convenient, and safe table-mounted routing.



Note: All stock ¾" medium-density fiberboard or birch plywood

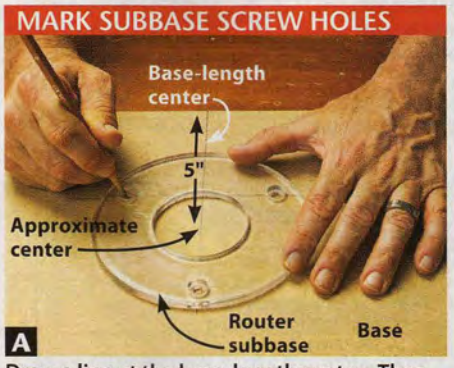
You can spend a grand or more on a full-featured router table, but this super-simple version helps you tackle most of the same jobs for just a few bucks. You need only a quarter-sheet of ¾" MDF or plywood and a few hours of shop time.

With this table, you can work without fear of a handheld router tipping on a narrow edge, rout profiles without a bearing-guided bit, and handle tricky jobs, such as routing grooves into workpiece ends.

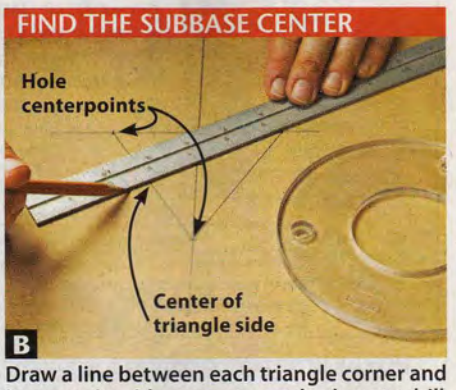
To make one, first cut all of its parts to size. At the center of the base along its length, measure 5" from one edge. Visually center your router subbase there, and mark mounting-hole centers **[Photo A]**. Using a straightedge, draw connecting lines between the hole centers to form a triangle. Now draw a line from one corner to the center of the opposite side, splitting the triangle **[Photo B]**. Repeat for the other corners and sides. The lines intersect at the precise router subbase center.

Using a Forstner bit, drill a 1½" hole at the intersection of the lines. Then drill countersunk holes for machine screws that fit your router base. (The ones that come with your router will be too short, so buy screws ¾" longer than the originals.) Now glue and screw the parts together to form the base and fence. Mount your router (without the subbase) on the underside, lay the table on two sawhorses, clamp the fence in position, and you're ready to rout.

Project design: **Jeff Mertz**
Illustration: **Roxanne LeMoine**



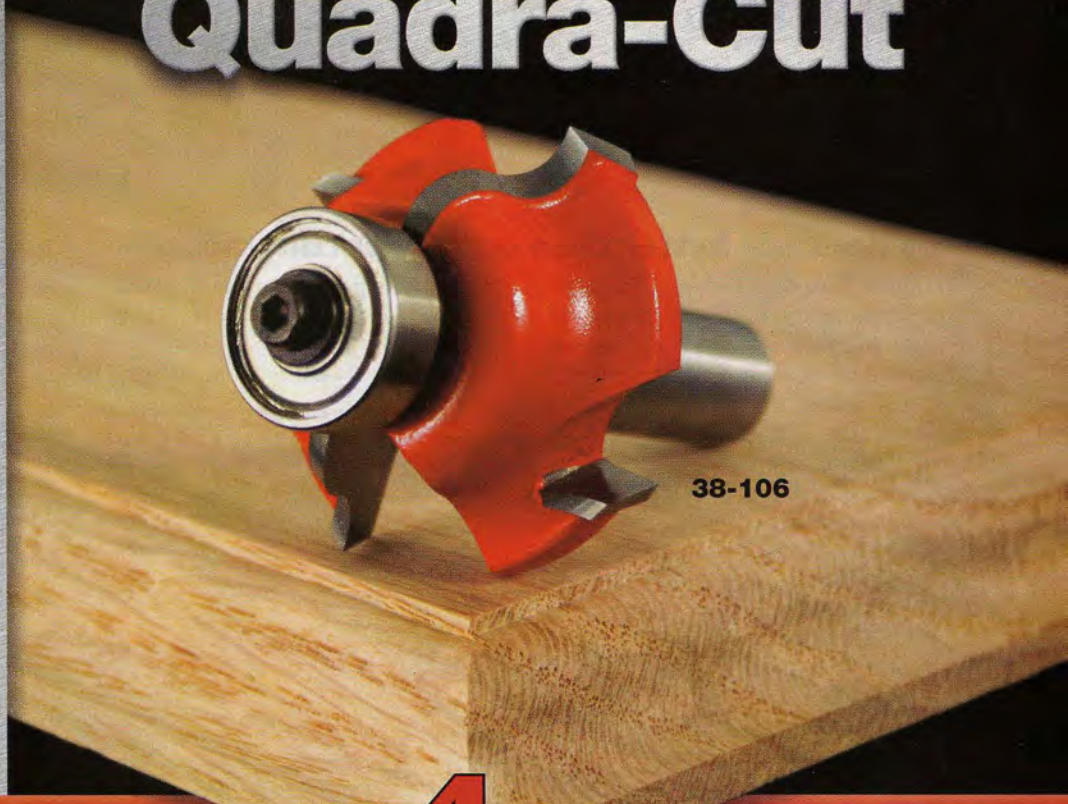
Draw a line at the base-length center. Then rough-position the base 5" from the edge and mark the base mounting-hole centers.



Draw a line between each triangle corner and its opposite side center to mark where to drill the router bit opening.

What's The Secret To Flawless Edge Profiles With NO REWORK?

Quadra-Cut™

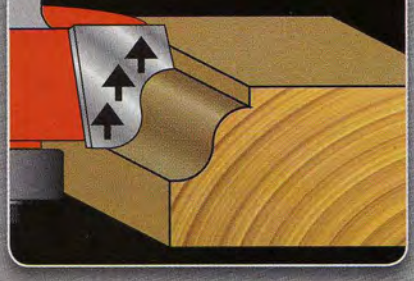


Freud's New Quadra-Cut™ 4 Cutter Design

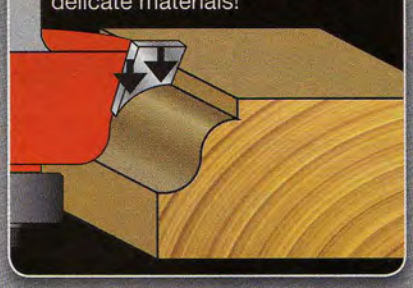
Quadra-Cut™ 4 Cutter Design

How It Works!

Two large cutter wings shear upward to remove most of the stock for fast, extremely smooth cuts.



Two small cutter wings shear downward for an ultra-fine finish, even when routing crossgrain in delicate materials!



U.S. Patent No. 8,899,252

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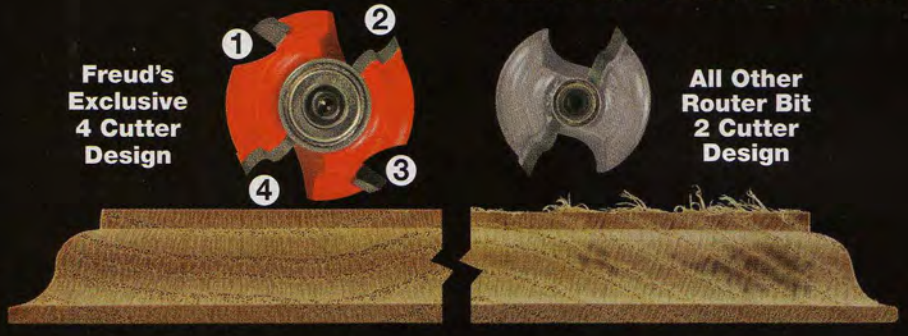

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- Beading Bit, 1-1/8" Radius
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- Table Edge Bit
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- Rounding Over Bit, 1-1/2" Radius
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Shop Tips

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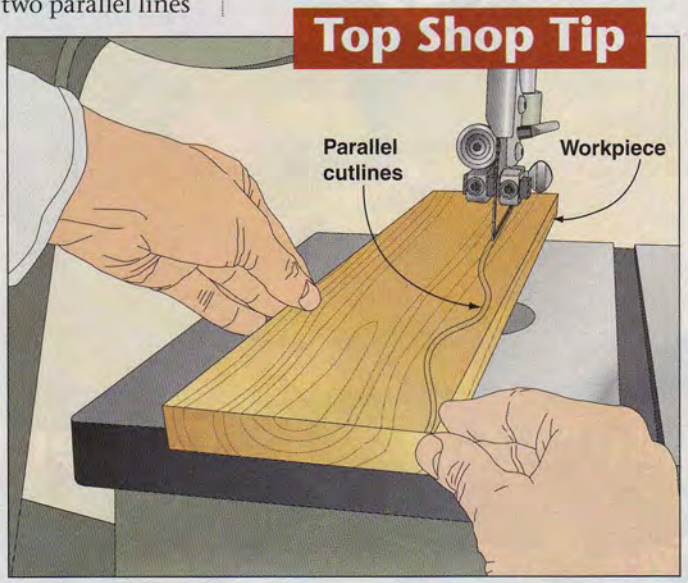
Two lines are better than one for cutting accurately

No matter how old or young, the first time we cut wood on the bandsaw, we learn to follow a single cutline, staying to one side of it. So it runs against our nature to accept that two parallel lines drawn on the workpiece are better than one. I'm not sure why shooting for the gap—1/16" is plenty—between the lines is easier, but since I started using this technique, I rarely let the blade wander over the line as I saw. Ironically, by giving myself more room for error, I get even closer to the perfect curved cut. To create the two lines, I simply freehand a line parallel to the original cutline. Go ahead and try it; I'll bet it'll work for you, too.

—Warren Perkins, Millington, Mich.

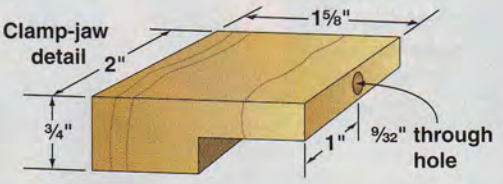


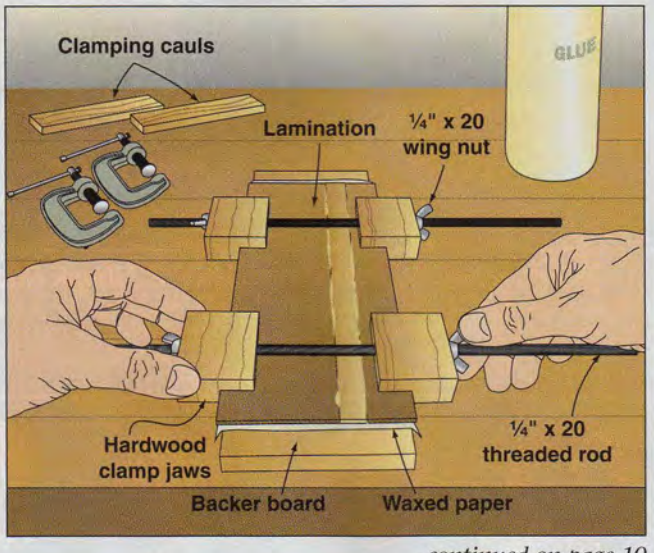
Diminutive clamps for delicate glue-ups

I make small, decorative boxes to hold coin and stamp collections, so I frequently have to edge-glue wood as thin as 3/16". My larger clamps aren't suited to this delicate process, so I made the clamps you see here.

The threaded rod and wing nuts give me fine control that lets me carefully control the pressure. I keep small scrapwood clamping cauls and C-clamps on hand. If the workpiece starts to bow as I apply pressure, I simply clamp the cauls on top with a backer board beneath, separating them from the workpiece with waxed paper.

—Merlin Lafferty, Sebring, Fla.





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The Top Tipster

Photo: Stelick Photography

To craft the intricate parts for his wooden model tractors, trucks, and trains, retired die-maker Warren Perkins needs a steady hand and a sharp eye. And it also doesn't hurt that his elegant Top Shop Tip gives him an edge at the bandsaw.

Warren Perkins earns a Craftsman 12" compound mitersaw for sending this issue's Top Shop Tip. Way to go, Warren!

Top tips earn tools!

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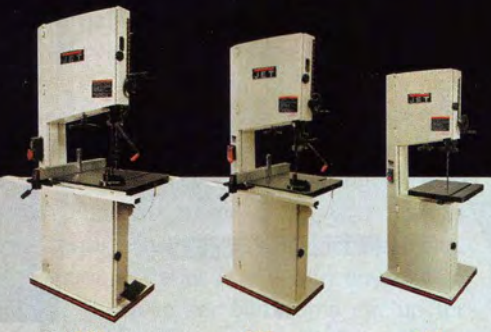

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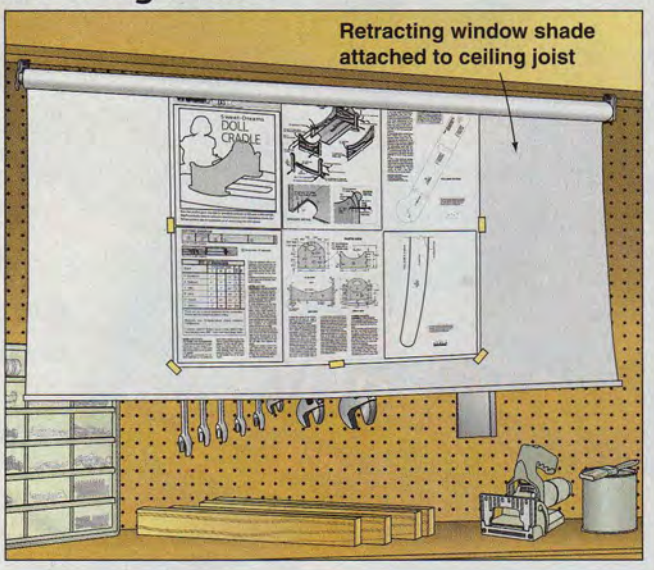
Shop Tips

Project plans ready for the big screen

Like most people, I have trouble finding space on the workbench for all the plans, parts, and tools required for a project. To get my plans out of the way but still keep them accessible, I hung a 48" retracting window shade from a ceiling joist. I tape the plans to the shade and, when I need them, they are only a "pull" away. The shade not only stores the plans and provides easy viewing, it preserves them from the usual wear and tear that takes place in the workshop.

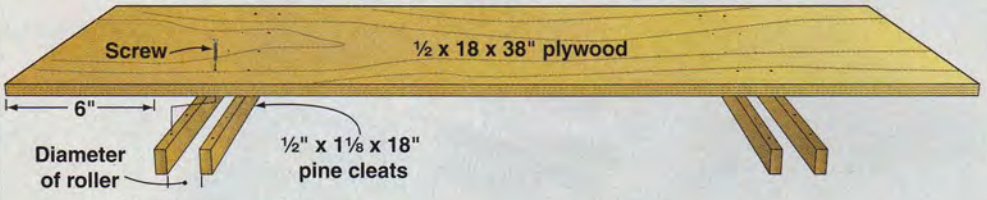
—Don Loeffler, Menomonee Falls, Wis.

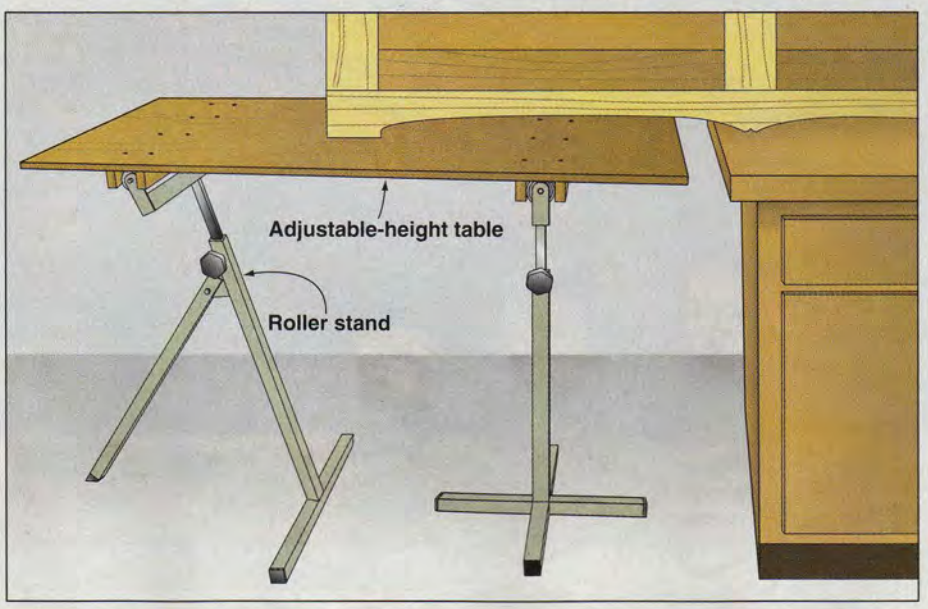


Roll out a just-right-height temporary table

It's always a time-consuming exercise to get a support table to match the height of my workstation when I need extra space. A single roller stand fulfills the height adjustability requirement, but it tends to be unstable for stationary work. But two roller stands, and a plywood tabletop with channels to fit over the rollers, provides just the right solution. Build the top as shown, and you have a temporary adjustable-height table anytime you need the extra workspace.

—Allan Rice, Winnipeg, Man.





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How Do You Create Beautiful, Customized Doors with any Wood Species?

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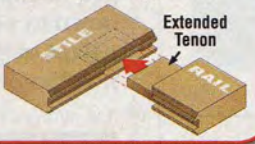

This Same Rail Bit allows for Stub & Extended Tenons

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For Stile Cuts

Rail Bit

For Making Stub Tenon Cuts on Rails

Raised Panel Bit

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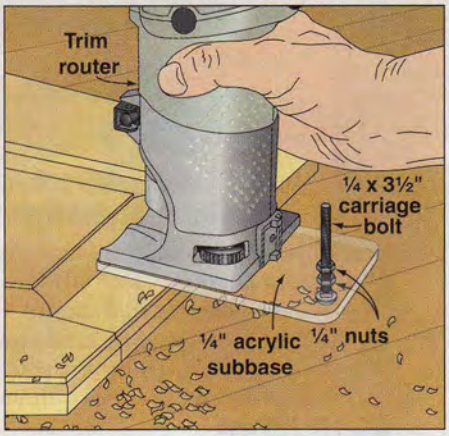
Shop Tips

Outrigger steadies your trim router

As a wheelchair-bound woodworker, I have to find novel ways to work efficiently in the shop. Holding a trim router steadily at arm's length was a challenge until I came up with the subbase you see here. Made out of ¼" clear acrylic, I added a ¼×3½" carriage bolt that serves as a stabilizing outrigger. I double-face-tape my workpiece down to a flat surface and adjust the height of the bolt, enabling me to rout it with no wobble at all.

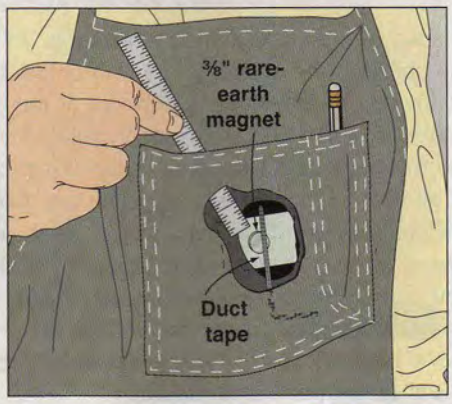
—Edwin Frampton, Clarksboro, N.J.



Small tools stay put in magnetic sticky pockets

I like to keep a small steel rule, a punch, and other useful items handy in my shop apron pocket. But they frequently fall out when I bend over to pick something off the floor. I solved this problem by duct-taping a ⅜"-diameter rare-earth magnet on the back of my apron, behind the pocket. Now all of my metal odds and ends stay securely tucked in my pocket, but not so securely that they aren't easy to retrieve when I need them.

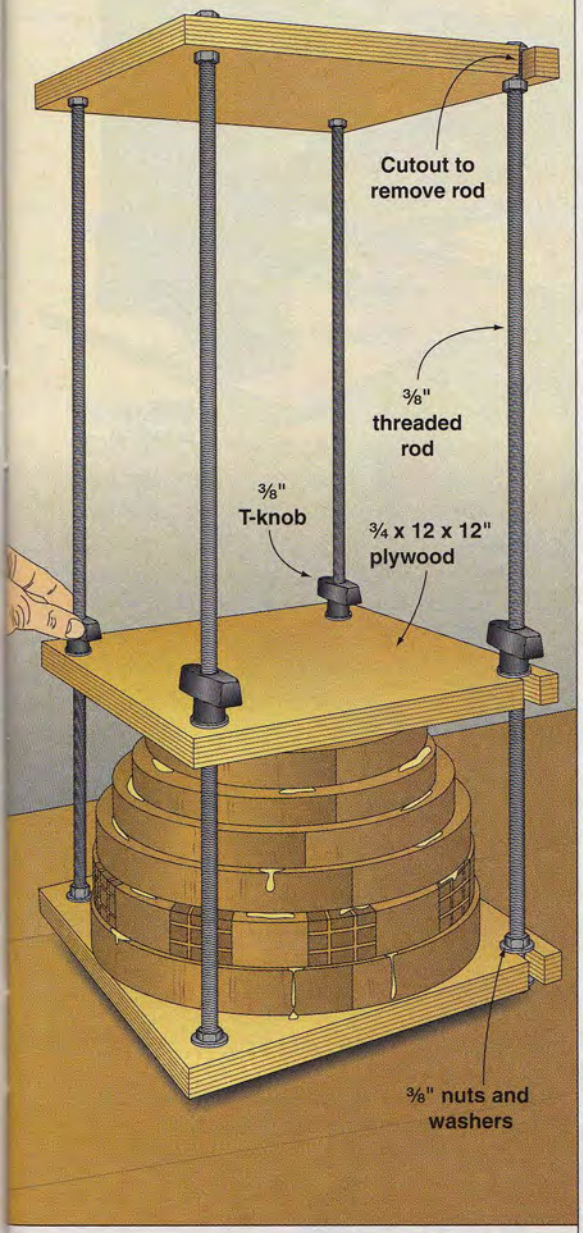
—Andy Newhouse, Syracuse, N.Y.



Large-capacity bowl press on a low-capacity budget

Commercial presses cost beaucoup bucks. So I came up with this low-dough version for gluing up segmented turnings. It consists of three pieces of ¾×12×12" plywood that ride on ⅜" threaded rod. Nuts and washers hold the top and bottom pieces in place, and the middle piece acts as the press. I simply turn the T-knobs to apply pressure. Even large bowls aren't a problem for this press because one rod detaches to allow easy access.

—John Hoffmann, Lancaster, N.Y.



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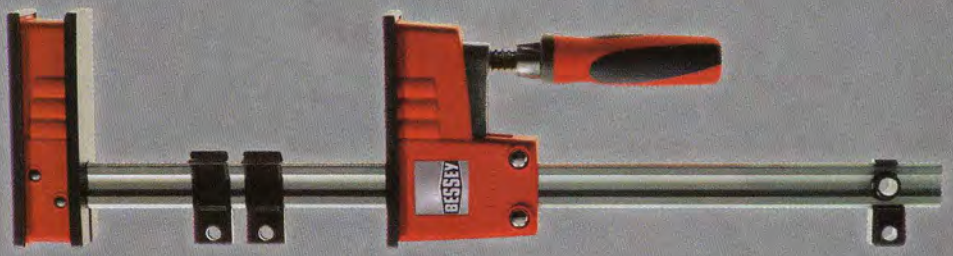

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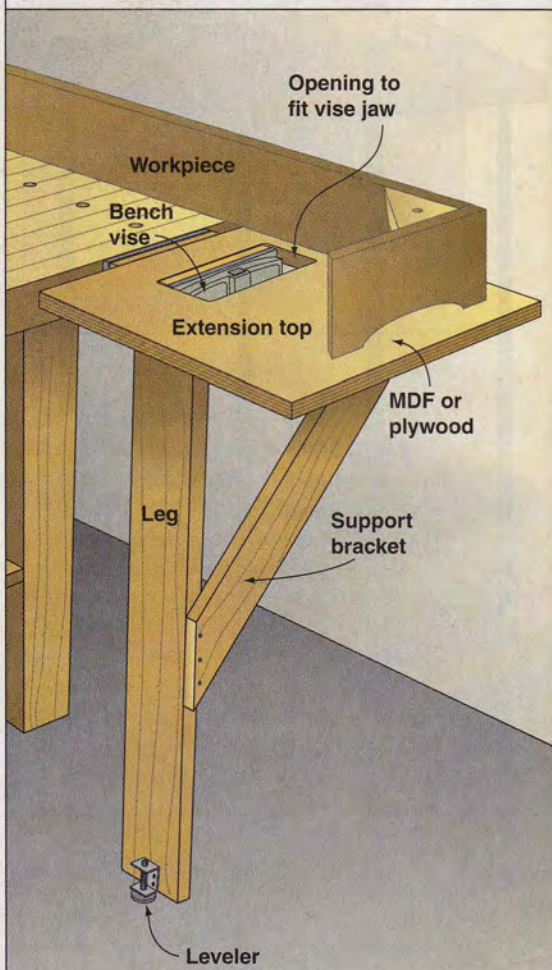
Shop Tips

Workbench expansion gives you a leg up

I was building a corner cabinet when I realized my workbench wasn't quite wide enough for the project. To solve the problem, I enlisted my bench vise to create a temporary workbench addition, as shown.

The extension top is a separate, compact table that's quickly but firmly held in place by the vise. To install it, I first use the bench vise to align the surface of the extension flush with the benchtop. Then I use the leg leveler to firmly position the rest of the extension and take some of the pressure off the vise.

—Dave Wywial, Janesville, Wis.



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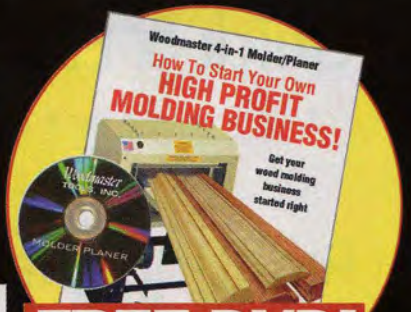

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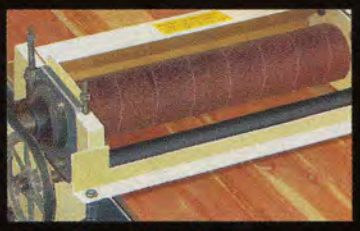

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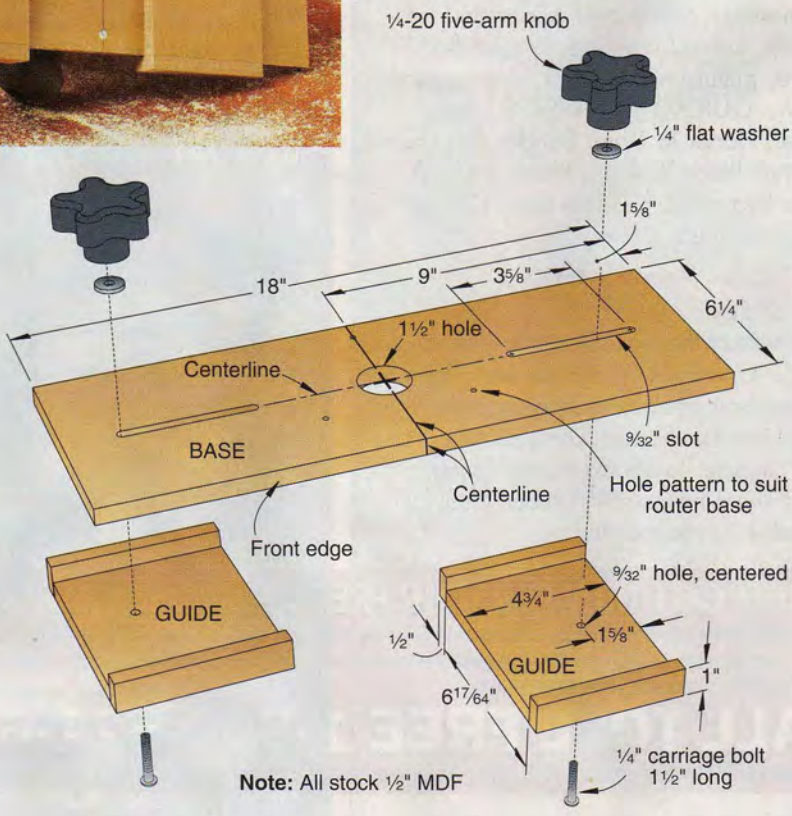
Mount your router to this simple-to-build jig, and guide it arrow-straight down the workpiece to rout flutes with dead-on precision. Build the jig shown, drilling mounting holes in the base to attach to your router base. Then, mark a centerline across the jig top and bottom directly under the centerpoint of the router collet. Extend the centerline up the front edge of the base.

To machine flutes, first mark the flute centerlines on your workpiece. Then, align the centerline on the jig's front edge with one of the flute locations, and slide the guides snugly against the edges of the workpiece, allowing just enough free play for the jig to slide without wobble. Tighten the knobs, set the bit's cutting depth, and rout the flute. If the second flute is the same distance from the opposite edge of the workpiece as the first flute, simply rotate the jig 180° and rout from the opposite end.



Project design: **Angelo Varisco, Coral Springs, Fla.**

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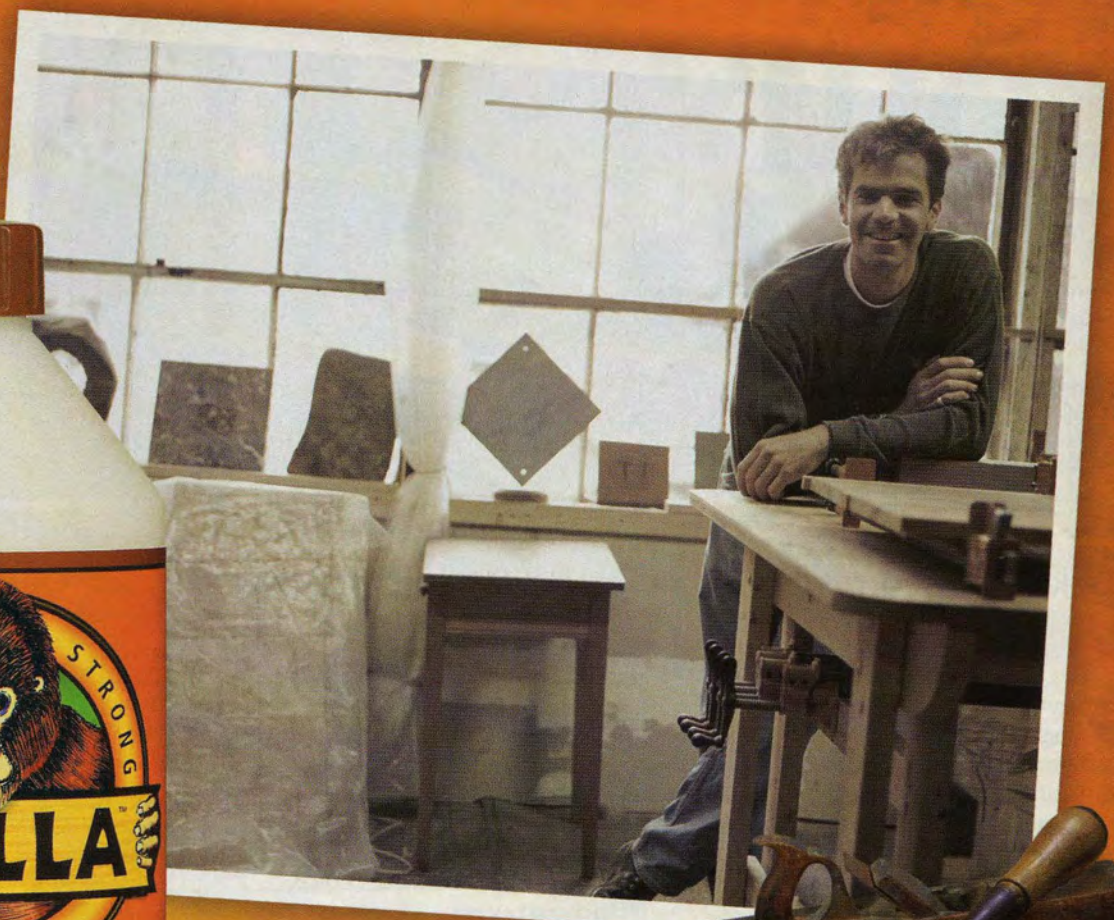

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Circle No. 50

Make Your Bed Movable

3 rock-solid bed-rail options that will let you rest easy.

Beds occupy more floor space than any furniture you'll build. So when moving day comes, you'll appreciate these handy hardware options for taking them apart.

To assemble the pencil-post bed on *page 24*, we used bed bolts that unscrew to detach the rails, headboard, and footboard from the posts. If this assembly loosens from wear or wood movement, simply rotate the decorative bold covers, and tighten the bolts to snug the joints good as new.

Not every furniture style works with bed bolts, though, so we offer these three great alternatives to match your bed design or woodworking skills. We won't tackle step-by-step installation instructions because bed-part sizes vary, but we will equip you with the basics.

1 A simple, solid solution: Tabbed bed-rail brackets

The easiest to install of these three, brackets come in sets of mating pairs **[Photo A]**. Each set includes enough hardware to assemble one bed.

+ Advantages: There's no mortising required; each bracket surface-mounts with four screws, as shown *above*. That makes it easy to center rails on the thickness of the posts. At $8 per set, they're the most economical choice.

– Disadvantages: All hardware can be seen from the top and inside. Rails can separate from the headboard or footboard when lifting the bed.

■ Installation basics: Separate the brackets into interlocking pairs, and each pair into right or left brackets. Drill and screw one bracket from a right pair and one from a left pair centered on the rail height and flush with the rail end. Then with the bracket pairs interlocked, place each rail where desired on the headboard or footboard posts or legs, and mark the bracket-hole locations. Drill and screw the mating brackets to the headboard or footboard.

BRACKETS WORK IN PAIRS

A

Tabbed bed-rail-bracket sets come with two left and right pairs 3¾" or 5¹¹⁄₁₆" (*shown*) long.

continued on page 20

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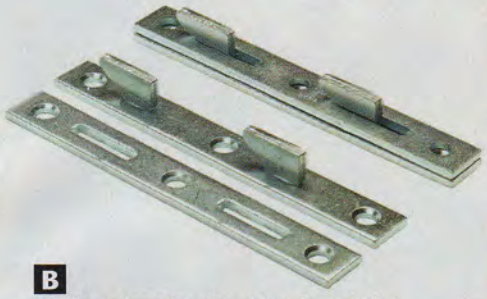
THERE'S A CRAFTSMAN IN ALL OF US

2 Hook-and-slot fasteners require mortises

Once you learn to rout the shallow mortises to accept the hardware shown **[Photo B]**, you'll appreciate the inconspicuous strength of these fasteners. You'll also find these handy for assembling other knock-down furniture, such as bookcases, where you want concealed fasteners.

HOOKS LOCK INTO SLOTS



B

Working in pairs, these hook-and-slot fasteners both mount inside mortises and disappear on an assembled bed.

+ Advantages: Once assembled, fasteners are hidden for the look of a mortise-and-tenon joint. You'll spend only $11 for a set to build one bed.

– Disadvantages: Mortising the bedposts and rail ends takes time, even with jigs. Half of these mortises must be deepened in places to accept the hooks.

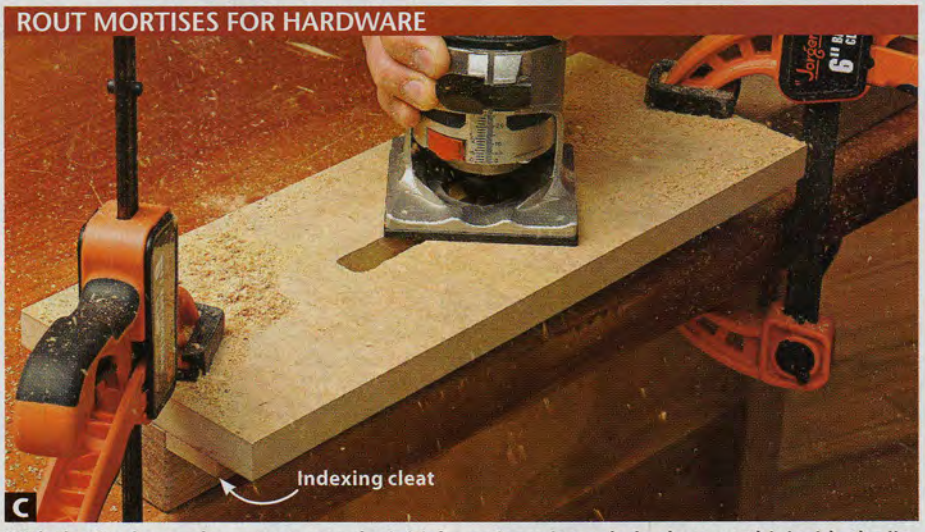
■ Installation basics: To cut the ⅝×5" mortises, first make post and rail-end mortising jigs similar to the one for the bed lock/hook fasteners (*page 22*), but with the opening bounded on four sides and sized for your project.

Attach the indexing cleat to the bottom of the post-mortising jig to center or offset the hardware. To mortise a post, clamp the jig with the opening where you want the slotted bracket. (Remember to index from the same corner on each post.) Set a dado clean-out bit for the jig thickness plus bracket thickness combined, and rout a mortise **[Photo C]**. Remove the jig, and square the corners with a chisel. To provide clearance for the rail-bracket hooks, use a ⅜" bit to drill out portions of the mortise ½" deep **[Photo D]**. Drill pilot holes, and then screw the bracket to the post using the longest screws that fit the post thickness **[Photo E]**.

To mortise the rails, center the mortising jig opening on the rail end, allowing at least 3/16" from the rail edges and faces. Clamp this jig to the rail end, and rout the mortise as you did with the bedpost. Square the corners with a chisel. Now drill ⅜" holes ⅛" deep in the mortise to accept the protrusions on the back side of the hook bracket.

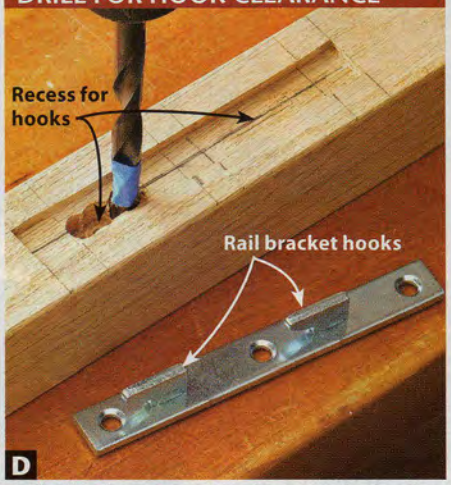
To give the bracket mounting screws better grip than in end grain alone, drill the bottom rail edge to accept a ½" dowel, as shown at *right*. Glue the dowel in place, and trim it flush with the bottom edge of the rail. Now drill 11/32" pilot holes, and attach the bracket with #8×1½" flathead wood screws. Index the jig from the same face or edge, and repeat on the other rail end. Then do the same for the other rail.

ROUT MORTISES FOR HARDWARE



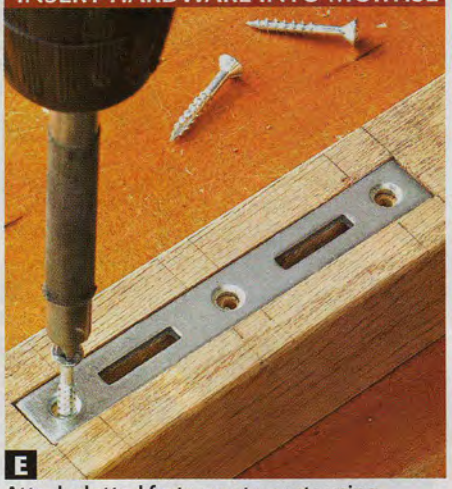
With the jig clamped to a post, rout the initial mortise using a dado clean-out bit inside the jig opening. Size the jig opening to fit the fastener width and length.

DRILL FOR HOOK CLEARANCE



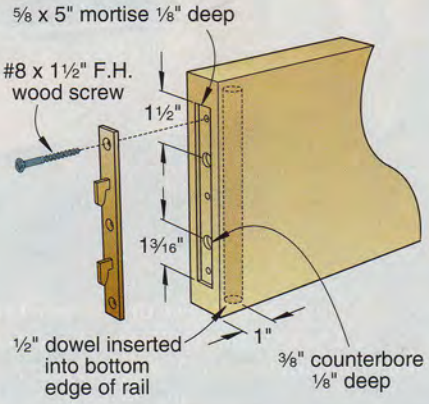
Drill ⅜" holes to provide clearance for hooks on the mating fastener to pass through the post-mounted fastener slots.

INSERT HARDWARE INTO MORTISE



Attach slotted fasteners to posts using #8×1¼" flathead wood screws. For the rail-mounted hook hardware, use #8×1½" screws.

BED-RAIL-END BRACKET



continued on page 22

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THERE'S A CRAFTSMAN IN ALL OF US

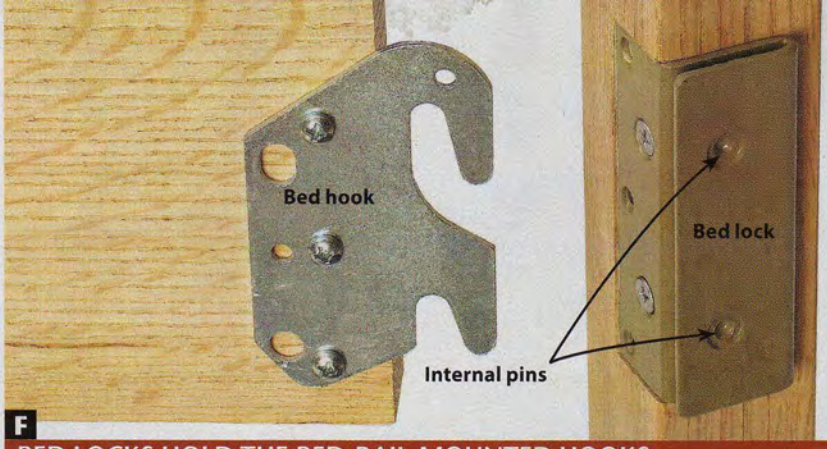
3 Bed lock/hook hardware requires a single mortise

To install these, rout one shallow mortise, and the L-shaped bed lock mounts flush with one bedpost face—far easier than cutting a slot and drilling the post for metal pins to accept the bed hooks.

+ Advantages: Integral metal pins in the bed locks, shown [**Photo F**], avoid potential alignment problems from drilling pin holes into the post. The bed lock holds the hooks at 90° angles for a square bed frame.

– Disadvantages: Bed rails must be at least 1⅛" thick to hide the mortised portion of the bedlock; the rest of the hardware remains exposed. Rails cannot be centered without adjusting the post or rail thickness to accommodate the hardware. At $15.60, four bed locks and hooks cost the most of these three options.

■ Installation basics: To rout consistent mortises, make the jig shown *right*. Position the opening in the jig where you want the mortise, and rout a 1/16" mortise using a dado clean-out bit. Square the rounded mortise corners with a chisel. Drill and screw the bed lock in place. Insert a bed hook into the bed lock, and mark the bed-hook mounting hole positions on the rails. Drill and screw the bed hook to the rail. Then repeat for the three other bed locks and hooks.

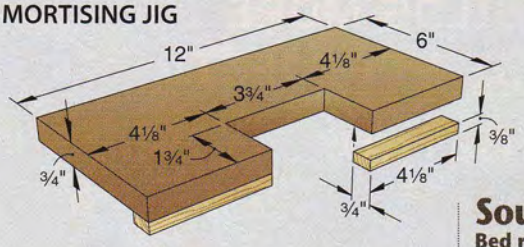


F

BED LOCKS HOLD THE BED-RAIL-MOUNTED HOOKS

Bed hooks, on the left, attach to two pins inside the bed locks. Rails must be at least 1⅛" thick to conceal the portion of the bed locks mortised into the posts.

MORTISING JIG



Sources

Bed rail brackets. Four 5¹¹/₁₆" pairs, no. 94K01.01, $7.90, Lee Valley Tools, 800-871-8158, or leevalley.com.

Dado clean-out router bit. No. 102-0802B ½" diameter, ¼" cutting length, $20, Eagle America, 800-872-2511, or eagleamerica.com.

Hook-and-slot fasteners. No. 127456, $11.50 for four sets, Woodcraft, 800-225-1153, or woodcraft.com.

Bed locks and bed hooks. Bed lock no. 01S02.01, $11.50 for four. Bed hooks no. 01S02.07, $4.10 for four, Lee Valley Tools.

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Circle No. 661

Easy
Tapered Legs!
See the article on page 32
Build it with or
without the canopy!

Pencil-Post Bed

Slender tapered bedposts give the pencil-post bed its name. Topped with a canopy—called a "tester"—this beauty fits many decorating styles.

The clean, elegant lines of this cherry four-poster bed, influenced by Shaker designs, make it a beauty to behold and build. Despite its size, you won't have any trouble getting it up stairs or around corners into the bedroom; it disassembles with ease. The bed is part of a matching set that includes a nightstand, a dresser with valet and mirror, and a lingerie chest, shown in the photo *below*.

Start with the posts

1 Laminate cherry blanks for the four bedposts (A). Start with a 1¾×6½×84" board for each post, and book-match the blank. To do that, joint one edge of the board, rip it to 6⅛" wide, and plane it to 1½" thick. Rip the board in half, and fold the two halves together [**Photo A**]. Glue and clamp the blanks, keeping the ends and edges flush.

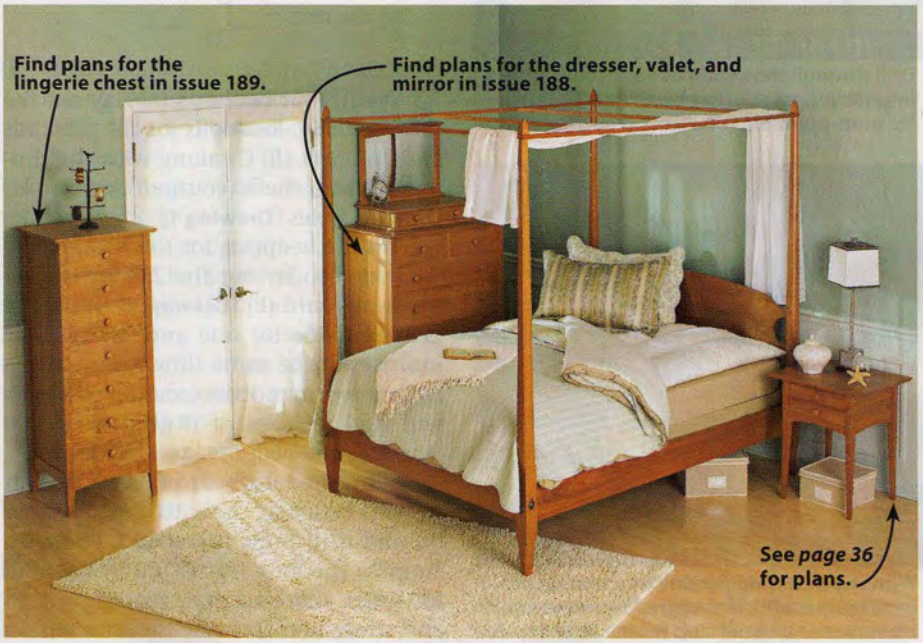
2 Joint and plane the blanks to 2¾" square, then cut them to length for the bedposts (A) [**Materials List**, *page 31*]. Save one of the cutoff pieces to make a jig later. Mark each bedpost on the bottom for its final position (LH for left-side head, for example).

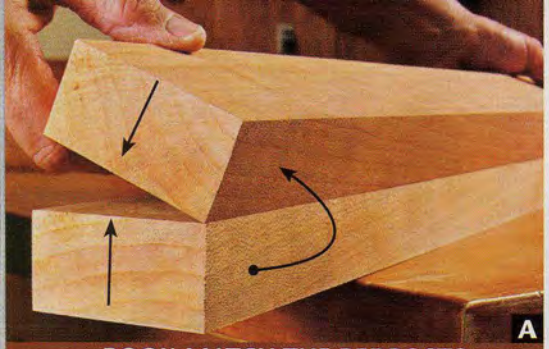
PROJECT HIGHLIGHTS

- Overall dimensions: 84½" long × 64½" wide × 83¾" high.
- Materials needed: cherry; maple would be appropriate, too.
- Frame holds a queen-size mattress.
- Build it with or without the top canopy frame.
- Bed assembles and disassembles for easy moving.

Skill Builders

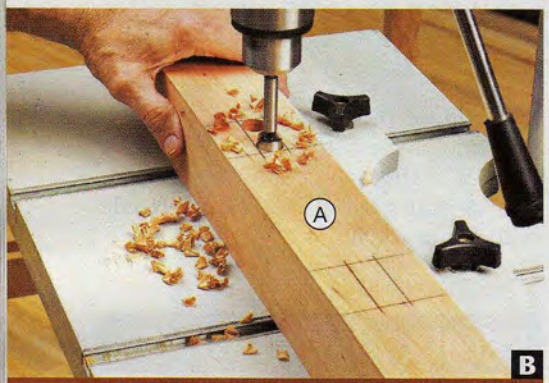
- Find out about book-matching stock.
- Discover how to taper long parts.
- Learn how to bandsaw compound-curved finials.


Find plans for the lingerie chest in issue 189.
Find plans for the dresser, valet, and mirror in issue 188.
See page 36 for plans.



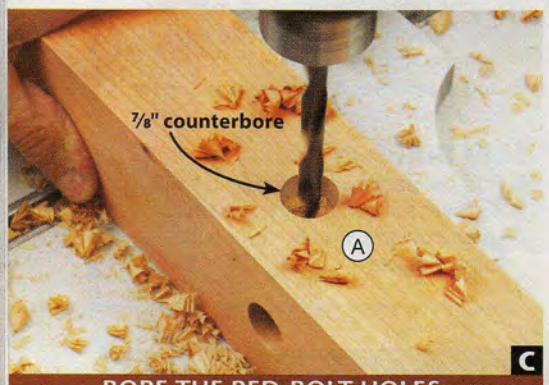
BOOK-MATCH THE BEDPOSTS

After ripping, bring together the faces that were on the same side of the board. This book-matching helps hide the joint.



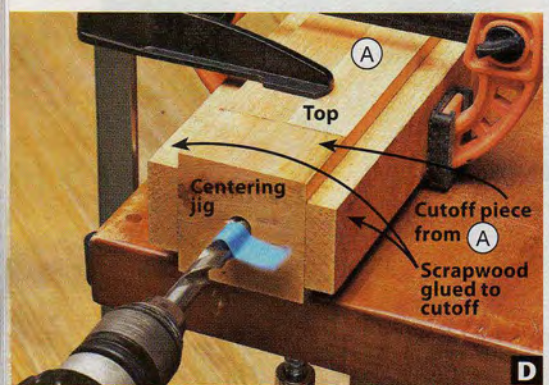
MORTISE TOWARD THE MIDDLE

Start at the ends when you form the mortises, then drill out the middle. Use the depth stop on the drill press for uniformity.



BORE THE BED-BOLT HOLES

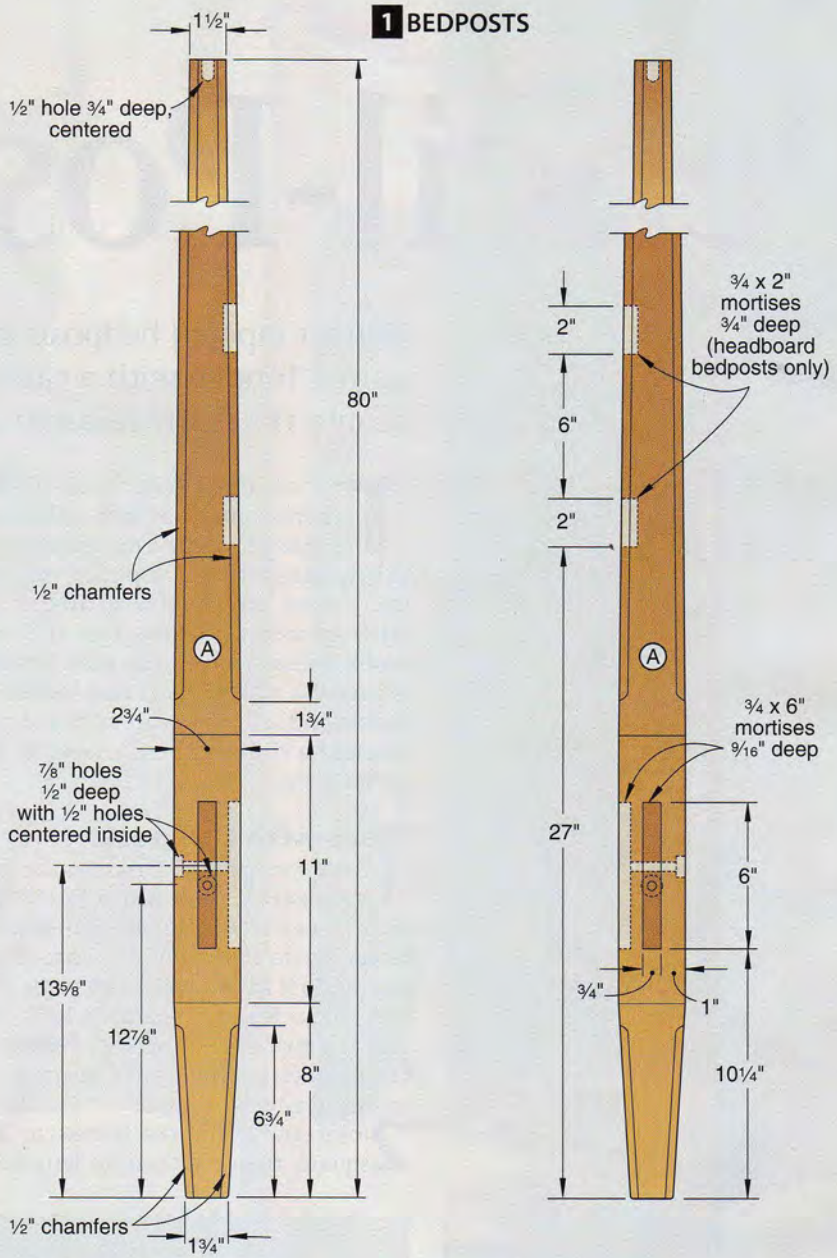
Drill through the center of each counterbore into the mortises in the bedposts (A) with a ½" brad-point bit.



CENTER A HOLE ON THE TOP

With the centering jig, drill into the top of each bedpost (A). Masking tape on the drill bit serves as a visual stop for the hole depth.

1 BEDPOSTS



3 On all four bedposts (A), lay out the 6" mortise locations for the side rails and end rails (B, C) along with the centerpoints for the ⅞" counterbores and ½" through holes [**Drawing 1**].

4 On the bedposts for the head of the bed, also lay out the 2" mortises for the headboard (F) [**Drawing 1**]. Place the bedposts side by side and lay out the mortises at the same time for accuracy. Differences in mortise location or length will lead to a lot of fitting when you assemble the bedposts and headboard.

5 Form the headboard (F) mortises in two bedposts (A) with a ¾" Forstner bit and drill press [**Drawing 1, Photo B**]. Support the long leg with a work stand for easier, more accurate drilling. Clean and straighten the mortise sides with a chisel, but leave the corners round to match the tenons on the headboard.

6 Using the same procedure, drill the mortises for the side rails and end rails (B, C) in all four posts (A) [**Drawing 1**]. Clean the mortise sides with a chisel, and square the corners.

7 Drill the ⅞" counterbores with a Forstner bit, then center a ½" hole through the bedpost (A) in each counterbore [**Drawing 1, Photo C**].

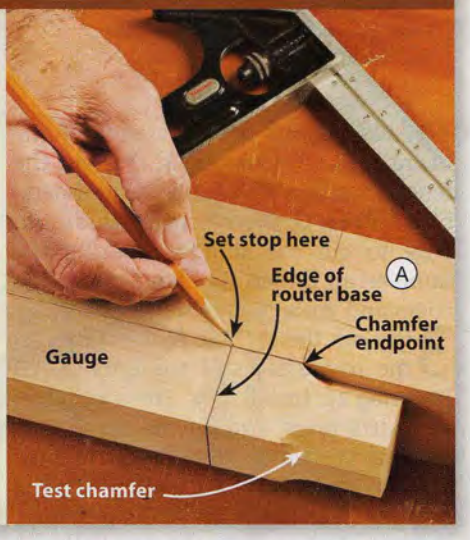
8 Cut a 2"-long block from the saved bedpost cutoff to make a centering jig. To do this, first make sure both ends are square to the sides. With a drill press, drill a ½" hole centered on the end of the block. Glue cleats to two opposite sides for clamping. (We made cleats measuring ¾×2×8" from scrapwood.)

SHOP TIP

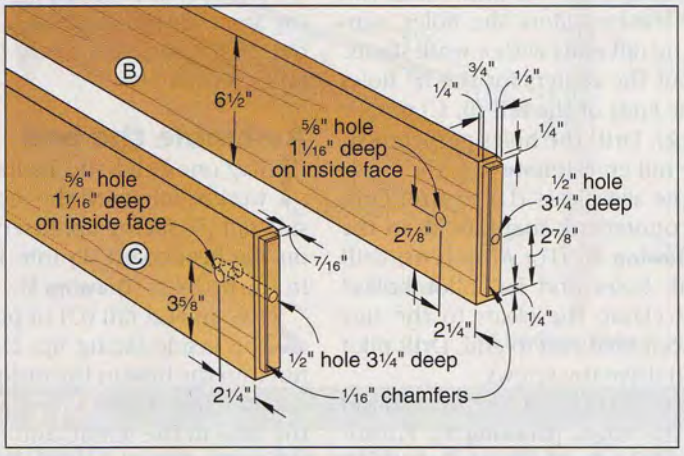
An easy way to cut stopped chamfers

A simple shop-made gauge helps you set stops for routed chamfers quickly and accurately. To make one, set up your router with a 45° piloted chamfer bit. Then, rout a chamfer 3" to 4" along the edge of a piece of scrapwood, marking the edge of the router base on the piece at your starting point.

To set a stop with the gauge, place the end of the chamfer on your test piece against the endpoint of the chamfer on the workpiece. Transfer the router-edge mark to the workpiece; clamp the stop there.



2 RAIL TENON DETAIL



9 Clamp the jig to the top of each bedpost (A) as a guide, then drill a ½" hole ¾" deep in each post [**Drawing 1, Photo D**].

Taper the bedposts

1 Construct the tapering jig shown on *page 34*. (You'll use the same jig to saw the long tapers and short tapers.)

2 Mark the center on the bottom of each bedpost (A) [**Photo E**]. Drill a 7/64" pilot hole 1½" deep at each center.

3 Install the short-taper bracket on the tapering jig. Set up the jig on your tablesaw, referring to the instructions in the article beginning on *page 32*.

4 Attach a bedpost (A) to the tapering jig, and cut the short tapers on all four sides at the bottom [**Drawing 1, Photo F**]. Repeat for the other bedposts.

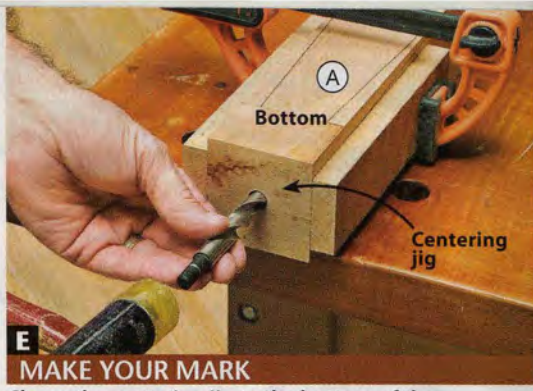
5 Change to the long-taper bracket on the jig. Attach a bedpost (A) and cut the long tapers [**Photo G**]. Be sure the bedpost is square to the blade and the jig before starting each cut. Repeat for the remaining bedposts.

6 Lay out the endpoints of the chamfers on the bedposts (A) [**Drawing 1**]. Chuck a piloted 45° chamfer bit into a handheld router, and rout the stopped chamfers along the edges of the bedposts [**Photo H**]. For an easy way to set a stop, see the **Shop Tip** *top*.

7 Sand the tapered faces to remove saw marks. Then, finish-sand the bedposts to 220 grit.

Ready the rails

1 Cut the side rails (B) and end rails (C) to size.



E MAKE YOUR MARK

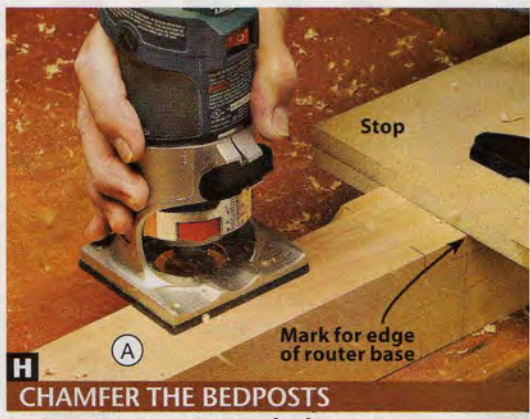
Clamp the centering jig to the bottom of the bedpost (A). Insert a ½" brad-point bit, and tap the end of the bit with a mallet.

F SAW THE SHORT TAPERS FIRST

The short-taper bracket holds the bottom of the bedpost (A) farther from the jig than the long-taper bracket.

G START LONG TAPERS AT TOP

Position work supports in front of and behind the tablesaw when cutting the long tapers on the bedposts.

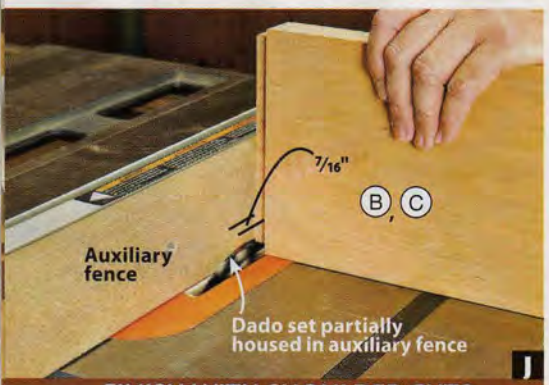


H CHAMFER THE BEDPOSTS

A trim router is convenient for forming chamfers on the bedposts (A). Set a stop for accurate, consistent chamfer lengths.

CUT TENONS ON A TABLESAW

To cut tenons on the rails (B, C) using the tablesaw, set up a work support and install a long extension on the miter gauge.

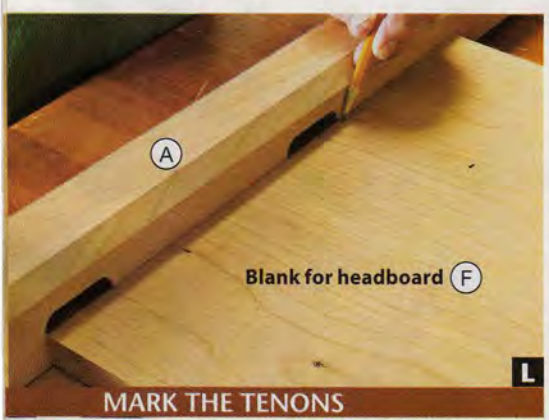


FINISH WITH SHOULDER CUTS

With an auxiliary fence and ¾" dado set, you can set tenon length precisely by measuring from the fence face to the outside blade.

DRILL TRUE WITH A DOWELING JIG

A doweling jig helps keep the holes in the ends of the rails (B, C) perpendicular to the ends, necessary for the bed bolts to line up.



MARK THE TENONS

Align the end of the headboard with the middle of the mortises in the bedpost (A). Mark the mortise locations on the blank.

2 Form tenons on both ends of the rails (B, C) [**Drawing 2**]. We cut the tenon cheeks with a tablesaw and dado blade [**Photo I**], then turned the rails on edge to cut the shoulders, using the same setup [**Photo J**]. Chamfer the top edges and tenon ends [**Drawings 2, 3**].

3 Lay out the ⅝" hole centerpoints on the inside faces of the rails (B, C) [**Drawing 2**]. Install a ⅝" Forstner bit in your drill press, and set the depth stop to bore 1 1/16" deep. Bore a test hole in scrap material the same thickness as the rails. If the point of the bit breaks through the face, reset the stop to bore a shallower hole. Then you can sand or file the end of the barrel nut to align the threaded hole with the bolt when you assemble the bed. Bore the holes, supporting the rail ends with a work stand.

4 Lay out the centers for the ½" holes on the ends of the rail (B, C) tenons [**Drawing 2**]. Drill the holes perpendicular to the rail ends [**Photo K**].

5 Cut the slat cleats (D) to size. Drill and countersink shank holes in the cleats [**Drawing 3**]. (For #8 screws, drill 5/32" shank holes and 7/64" pilot holes.) Glue and clamp the cleats to the side rails (B), centered end to end. Drill pilot holes, and drive the screws.

6 Cut the slats (E) to size, and round over the edges [**Drawing 3**]. Finish-sand the side rails (B/D), end rails (C), and slats to 220 grit.

Shape the headboard

1 Edge-glue stock to make a ¾×16½×61" blank for the headboard (F).

2 Dry-assemble and clamp the bedposts (A) and end rail (C) that will make up the head of the bed. Measure the distance between the bedposts *inside* the headboard mortises. Cut the blank for the headboard (F) to this length.

3 Disassemble the bedposts (A) and end rail (C). Lay one bedpost on your workbench and position the headboard blank (F) with its bottom edge aligned with the bottom edge of the lower headboard mortise [**Photo L**]. Mark the top and bottom of both mortises on the headboard blank. Repeat for the other end of the headboard.

4 Enlarge the **Headboard Half-Size End Pattern** in the *WOOD Patterns®* insert to make a full-size pattern. Using that pattern and the gridded headboard pattern, lay out the headboard (F) on your blank. Make sure the tenons on the end match the mortises on your posts; adjust the tenons as necessary. After you lay out the ends, mark the center of the headboard, and draw the curve along the top with a fairing stick [**Photo M**]. (To download a free fairing stick plan, go to woodmagazine.com/fairing.)

5 Bandsaw the headboard (F) to shape, cutting slightly outside the lines. Sand to the lines.

6 Round over the edges of the headboard (F) with a 5/16" round-over bit in a handheld router.

7 Finish-sand the headboard (F). Sand the tenons to fit the mortises, allowing some clearance so they slide in and out of the mortises easily for assembly and disassembly.

Assemble the bed

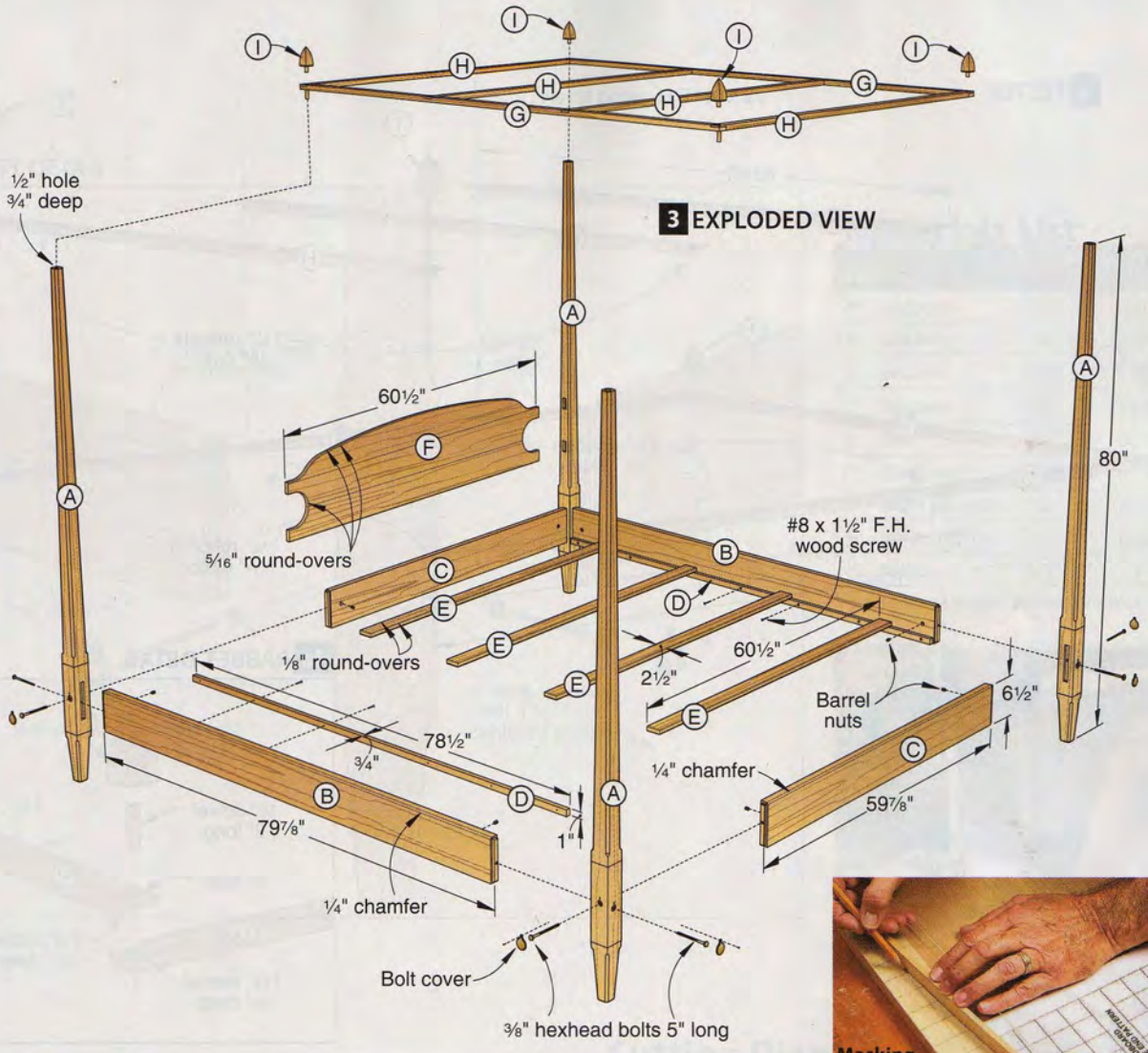
1 Lay one head-end bedpost (A) on a workbench, with the mortise for the side rail (B) facing up. Insert the tenons on the headboard (F) into the mortises in the bedpost [**Drawing 3**].

2 Lay an end rail (C) in position, with the inside facing up. Drop a barrel nut into the hole in the inside face of the end rail. Insert a ⅜×5" hexhead bolt into the hole in the tenon, and try to thread it into the barrel nut. If the threads do not line up, remove the barrel nut, and sand or file the inside end until it drops far enough into the hole to start the bolt. Don't try to drill the cross holes in the rails deeper; that risks breaking through the rail.

3 Slide the tenon on the end rail (C) into the mortise in the bedpost (A) [**Drawing 3**]. Insert a bed bolt through the hole in the bedpost and thread it into the barrel nut in the end rail [**Drawing 5**, **Photo N**]. If you have trouble pushing the bolt as you turn it to get it started, see the **Shop Tip** on the *opposite page*.

4 Attach the other head-end bedpost (A) to the end rail (C). Assemble the foot-end bedposts and end rail the same way [**Drawing 3**].

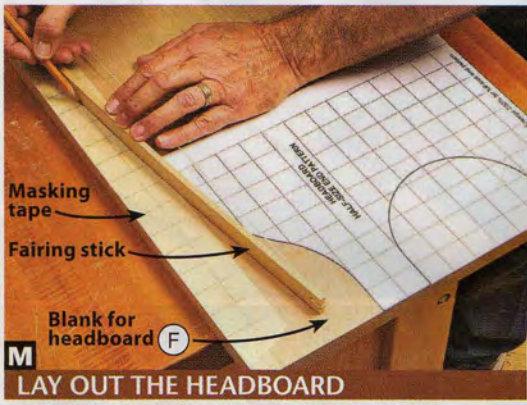
5 Stand the assembled ends (A/C/F and A/C) with the mortises for the side rails (B) facing each other [**Drawing 3**]. Attach the ends to the side rails with bolts, as you did the end rails (C).



SHOP TIP

Starting bolts goes quickly with a dowel in a socket

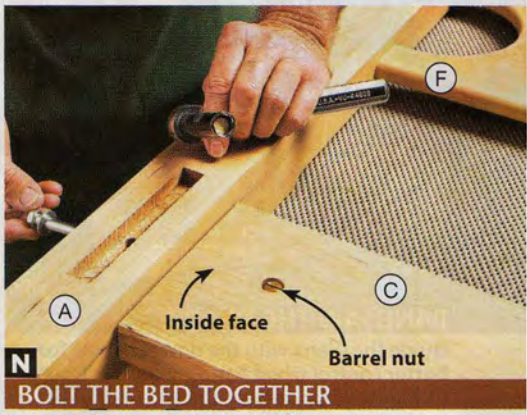
A dowel rod inside a deep-well socket makes easy work of starting a bolt inside a counterbore. Slide a dowel into the socket and mark the socket depth on it, shown *below*. Then subtract the thickness of the bolt head, shown *below right*. Cut the dowel to that length and drop it into the socket. With the packed socket, you can push the bolt inward as you turn it, for easier starting.



M

LAY OUT THE HEADBOARD

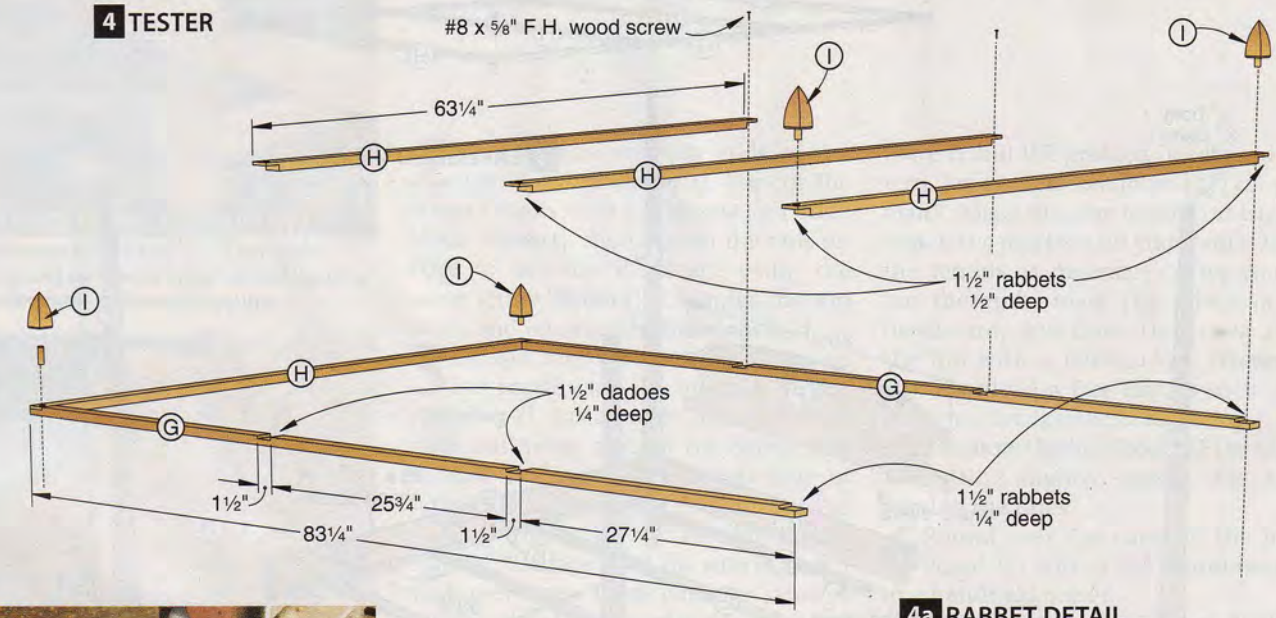
Lay out the curve from the end pattern to the center of the headboard (F). Apply masking tape along the top for easier layout.

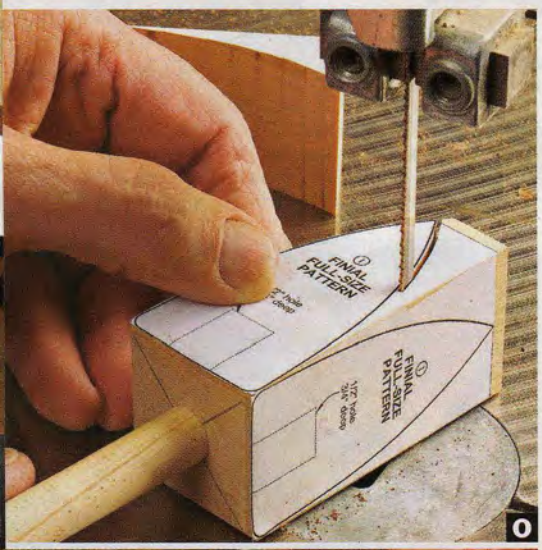


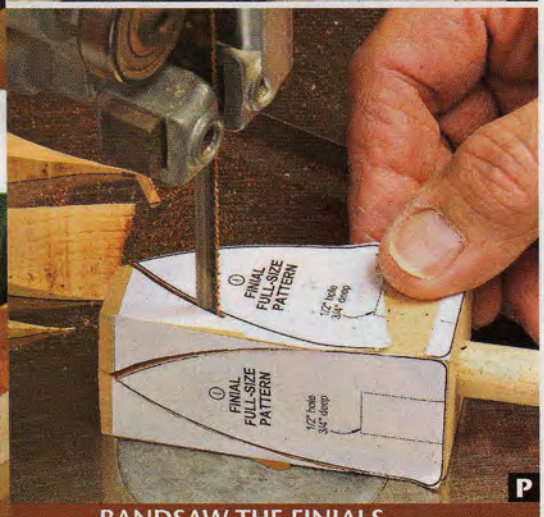
N

BOLT THE BED TOGETHER

Put a washer onto the bed bolt, then insert the bolt through the bedpost (A) into the barrel nut. Tighten with a socket wrench.

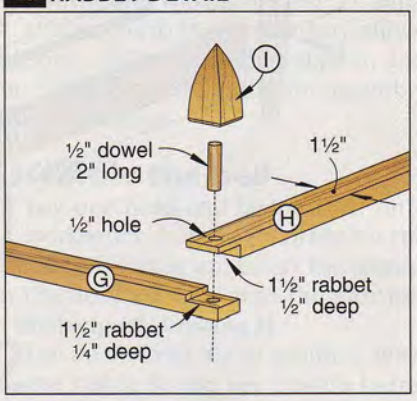






BANDSAW THE FINIALS

Guide the blank with the dowel handle for better control when bandsawing the finials (I). Saw slightly outside the line (*top*) to cut both patterned faces. After the first cut, sand to the line before reattaching the cut-off pieces for the final cut (*bottom*).



Top it off with a tester

1 Cut the tester side rails (G) and tester cross rails (H) to size.

2 Lay out the rabbets and dadoes on the tester side rails (G) [**Drawing 4**]. Cut them in several passes on a tablesaw with a ¾" dado blade set to cut ¼" deep. You can cut both side rails together.

3 Cut the rabbets on the ends of the tester cross rails (H). You can use the same setup you did for rabbeting the side rails (G), except change the cutting depth to ½".

4 Dry-assemble the four corner joints (G, H) and drill a ½" hole through the center of each joint [**Drawing 4a**].

5 Drill and countersink shank holes at the ends of the remaining two tester cross rails (H) [**Drawing 4**]. Lay the cross rails in position on the side rails (G) and drill pilot holes ⅜" deep. Be careful not to drill through the rails. Finish-sand the side rails (G) and cross rails (H).

6 Cut ½" dowels 2" long [**Drawing 4a**] and insert them into the holes in the tops of the bedposts (A). Lay the tester side rails (G) over the dowels. Install the tester cross rails (H), securing the middle two with screws [**Drawing 4**].

Fashion the finials

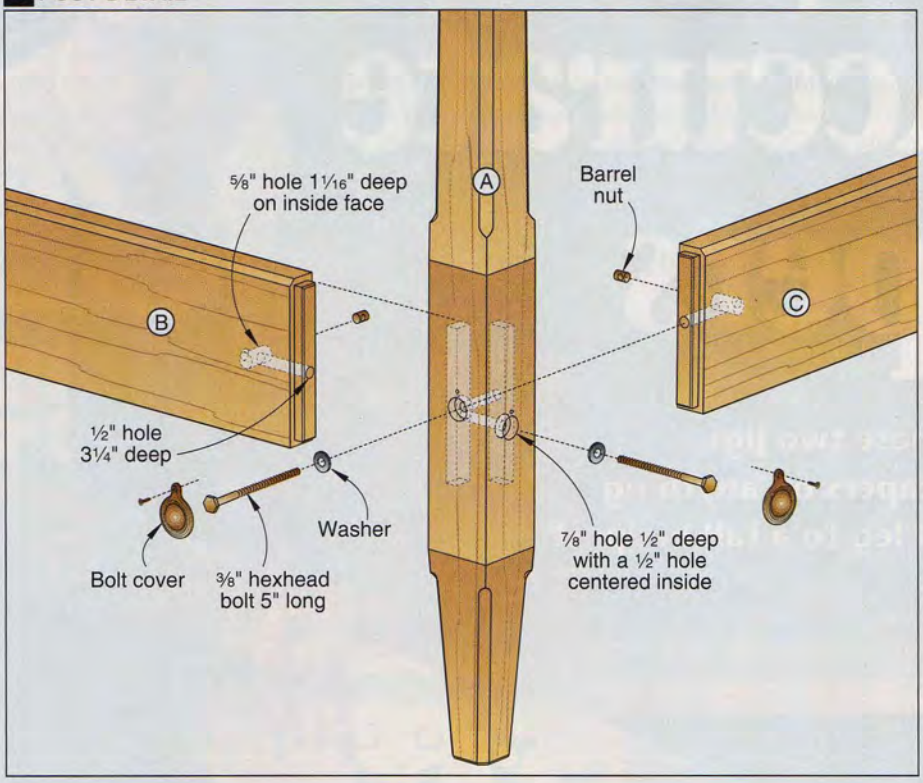
1 Cut blanks for the finials (I) ⅛" longer than listed.

2 Drill a ½" hole ¾" deep, centered on the bottom of each blank. Cut a length of ½" dowel rod about 6" long; you'll use this as a handle to saw and sand the finials to shape.

3 Make eight copies of the **Finial Full-size Pattern** in the *WOOD Patterns*® insert. Attach patterns to two adjacent sides of each finial (I) blank. Align the bottom of the pattern with the bottom of the blank (the end with the hole). Insert the dowel handle into one hole.

4 Bandsaw the first face [**Photo O**]. Then, reattach the cut-off pieces with double-faced tape, and saw the pattern line on the taped-on pieces [**Photo P**]. Sand round-overs along the bottom.

5 POST DETAIL



Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A*	bedposts	2¾"	2¾"	80"	LC	4
B	side rails	1¼"	6½"	79⅞"	C	2
C	end rails	1¼"	6½"	59⅞"	C	2
D	slat cleats	¾"	1"	78½"	C	2
E	slats	¾"	2½"	60½"	C	4
F*	headboard	¾"	15"	60½"	EC	1
G	tester side rails	¾"	1½"	83¼"	C	2
H	tester cross rails	¾"	1½"	63¼"	C	4
I*	finials	1½"	1½"	3"	C	4

*Parts initially cut oversize. See the instructions.

Materials key: C–cherry, EC–edge-glued cherry, LC–laminated cherry.
Supplies: #8×⅝", 1½" flathead wood screws, ½" dowels.
Blade and bits: Chamfer bit, ⅛" round-over bit, rabbeting bit, dado set.

Source

Bed bolts, covers: Set of four 5" hexhead bolts, washers, and brass barrel nuts, no. 05G1701, $13.50 (order two sets); brass bed-bolt covers with screws, Classic style, no. 00A2814, $3.05, (order eight). Lee Valley, 800-871-8158, leevalley.com.

5 Finish-sand the finial (I). Remove the dowel handle and place the finial over the dowel on top of one bedpost (A). Repeat for the other three finials.

It's about time for bed

1 Disassemble the bed for finishing. If you sanded any of the barrel nuts so the bolts would line up, mark their positions. Inspect all parts and touch-up sand as necessary.

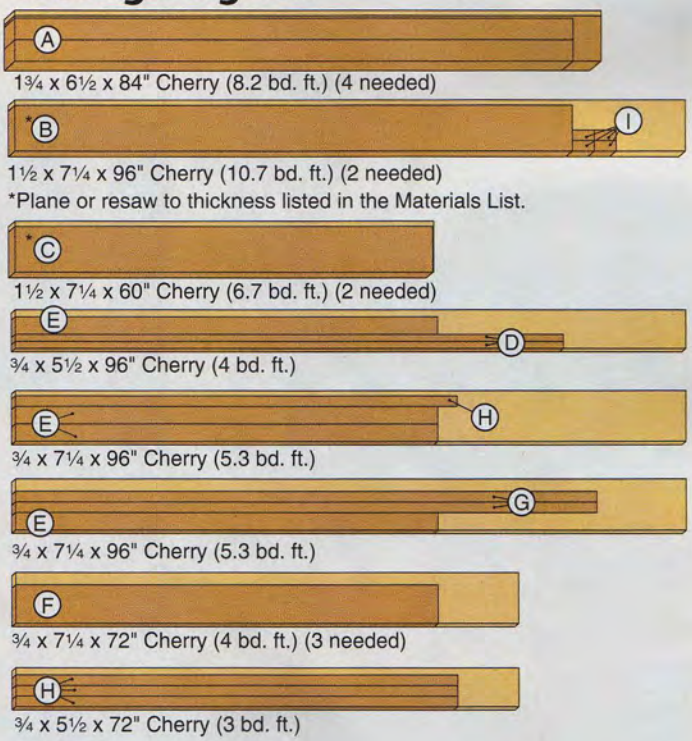
2 Stain as desired. (We stained the bed parts with Minwax no. 607 Cherrywood gel stain to enhance the color of the cherry.)

3 Apply a clear finish. (We applied three coats of satin polyurethane, sanding with 320-grit between coats.)

4 Reassemble the bed, and attach decorative covers over the bed-bolt holes in the bedposts (A) [**Drawing 5**], using the screws provided.

Written by **Larry Johnston** with **Chuck Hedlund**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Cutting Diagram


A
1¾ x 6½ x 84" Cherry (8.2 bd. ft.) (4 needed)
B
I
1½ x 7¼ x 96" Cherry (10.7 bd. ft.) (2 needed)
*Plane or resaw to thickness listed in the Materials List.
C
1½ x 7¼ x 60" Cherry (6.7 bd. ft.) (2 needed)
E
D
¾ x 5½ x 96" Cherry (4 bd. ft.)
E
H
¾ x 7¼ x 96" Cherry (5.3 bd. ft.)
E
G
¾ x 7¼ x 96" Cherry (5.3 bd. ft.)
F
¾ x 7¼ x 72" Cherry (4 bd. ft.) (3 needed)
H
¾ x 5½ x 72" Cherry (3 bd. ft.)

2 Techniques for Fast, Accurate Tapers

With these two jigs, you can rip tapers on anything from a footstool leg to a tall bedpost.

When it's time to taper furniture legs, an adjustable jig will handle 90 percent of those jobs. But that other pesky 10 percent—such as the 80" posts for the pencil-post bed on *page 24*—can give you fits. By tailoring a tapering jig to your workpiece though, you'll get consistent results, regardless of its length.

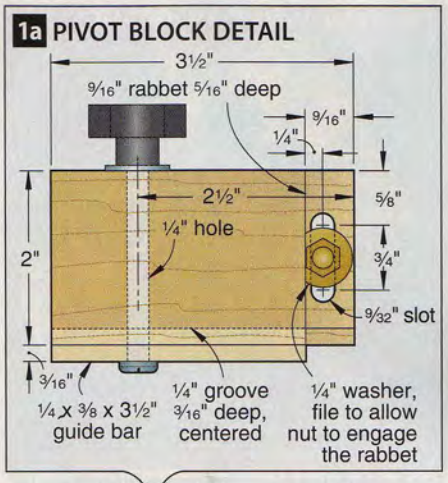
To cut accurate tapers, first make sure your tablesaw fence parallels the blade and the blade aligns 90° to the saw table. A 24-tooth ripping blade helps prevent burn marks. Also, joint and plane all four faces of your workpieces square so they'll index accurately on the jigs. Ready? Let's tackle that 90 percent first.

Build an adjustable jig to handle day-to-day needs

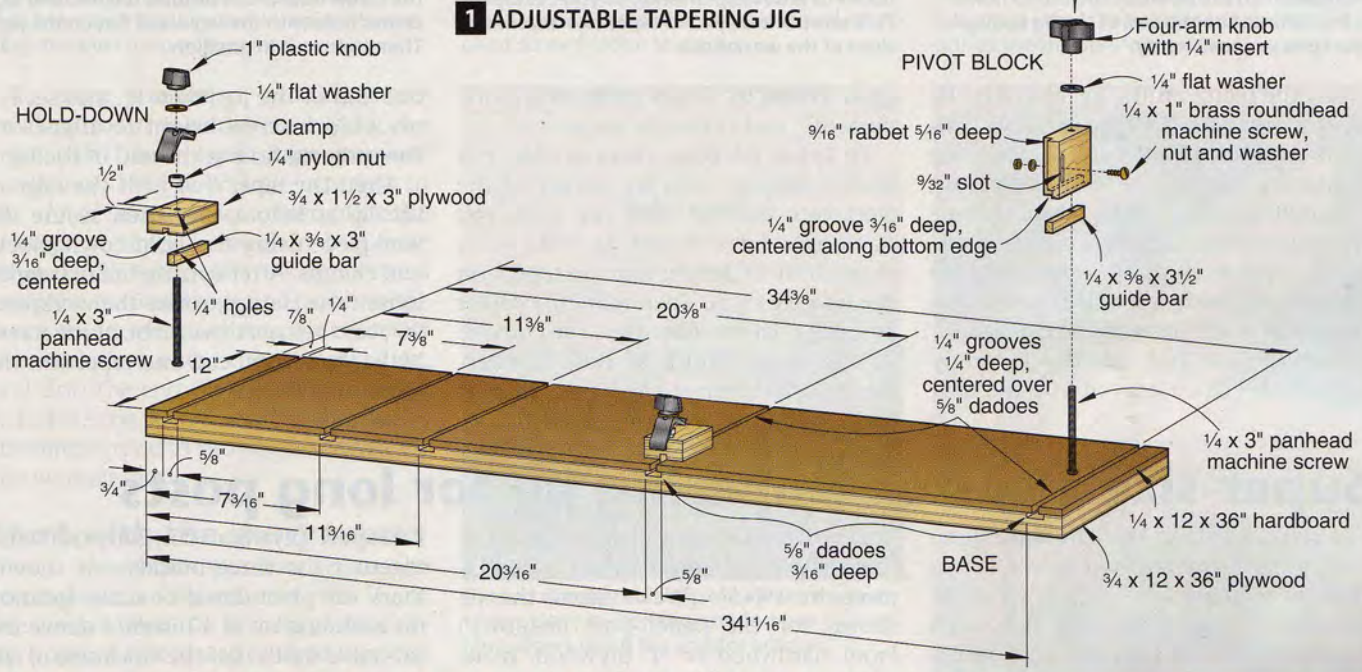
This adjustable tapering jig, **Drawing 1**, holds table or cabinet legs shorter than 34" and up to about 2¼" thick. Build the base by cutting grooves in ¾" birch plywood and gluing ¼" hardboard to the top to form slots. Make the two movable hold-downs and the pivot block from scraps of hardwood and plywood. (To find the jig hardware, see **Sources**.)

To taper two adjoining faces of a leg blank, first mark the tapers on the sides of the leg [**Photos A** and **B**]. Capture the base between the blade and rip fence, and adjust the fence out just a hair to prevent the jig from touching the saw blade. Then set the blade higher than the combined thickness of the jig base and the leg blank.

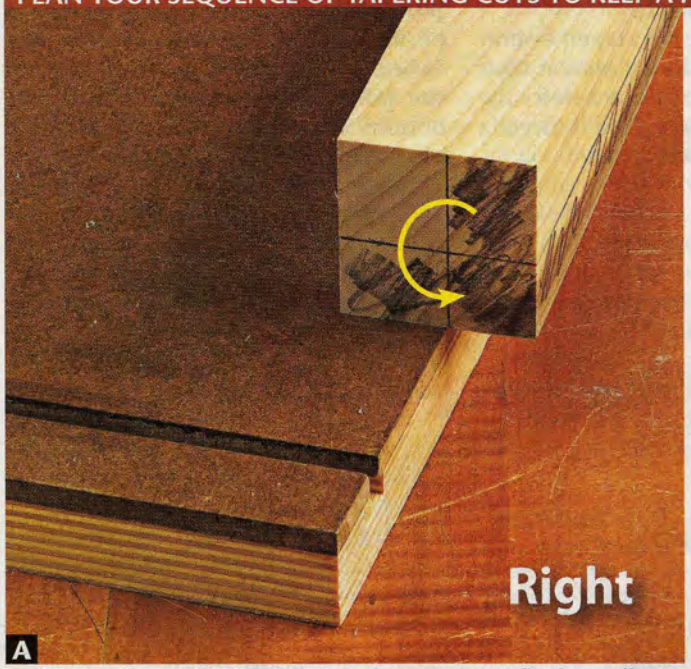
1a PIVOT BLOCK DETAIL



1 ADJUSTABLE TAPERING JIG

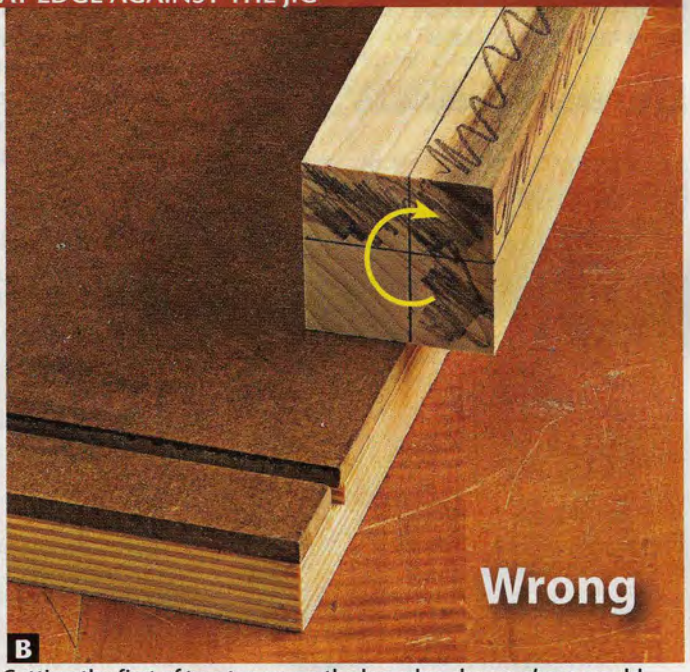


PLAN YOUR SEQUENCE OF TAPERING CUTS TO KEEP A FLAT EDGE AGAINST THE JIG



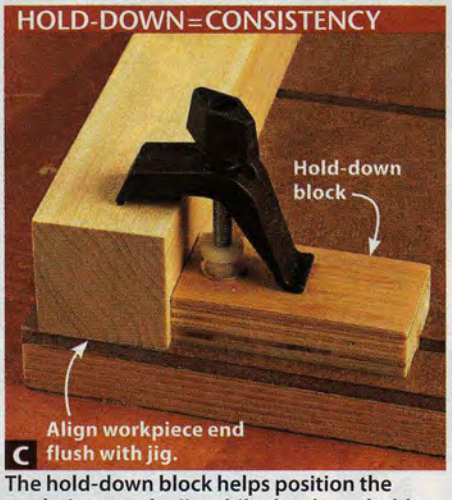
A

Positioning the workpiece as shown *above* ensures a flat face will rest on the base and against the hold-downs for the second tapering cut.

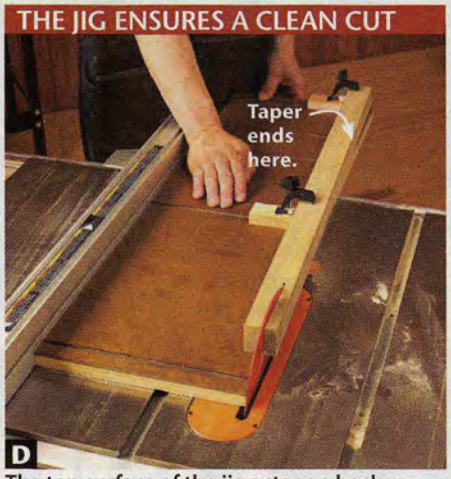


B

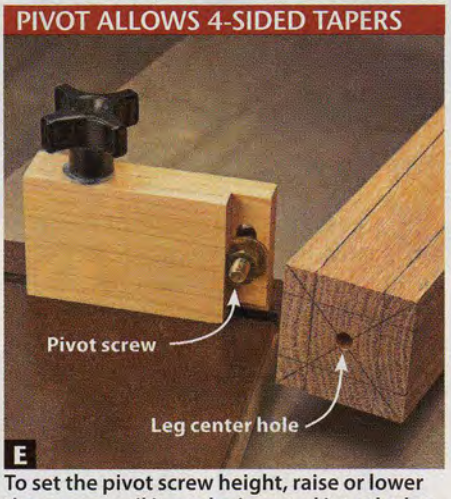
Cutting the first of two tapers on the leg edge shown *above* would place a tapered edge against the jig base for the second cut.



The hold-down block helps position the workpiece on the jig while the clamp holds it for cutting. Use the end of the jig to align workpieces consistently.



The top surface of the jig acts as a backer board to reduce splintering as you cut tapers. This setup allows you to taper two adjoining sides of the workpiece.



To set the pivot screw height, raise or lower the screw until it can be inserted into the leg center hole with the leg blank flat on the jig. Then tighten it in position.

Lay the blank on the jig, aligning the taper marks with the edge of the jig closest to the blade [**Photo A** and **B**]. Make the nontapered workpiece end flush with the trailing end of the jig [**Photo C**]. Slide the hold-down blocks against the workpiece to act as stops, and tighten them down using the nylon nuts. Then secure the blank to the jig with the clamps.

Start the saw, and slide the jig tightly against the fence as you cut the first taper [**Photo D**]. Then rotate the workpiece 90°, and make the second cut.

To taper all four sides of a leg, you must reference from the center of the workpiece because after two cuts, you no longer have square faces to work from. Start by laying out the tapers on the four leg faces. Then mark the center and diagonal lines between the corners. At that mark, drill a ¼" hole ½" deep. Next place the pivot block into a slot at one end of the jig [**Photo E**], and set the pivot-block screw height to align with the centered hole at the end of the leg.

Align the taper line with the edge of the jig as before, and then secure the workpiece using the hold-down blocks and clamps. After cutting the first taper, loosen the clamps, rotate the workpiece 90°, and reinsert the pivot block screw. Make the second cut, and repeat for the remaining two tapers.

Super-size a custom tapering jig for long posts

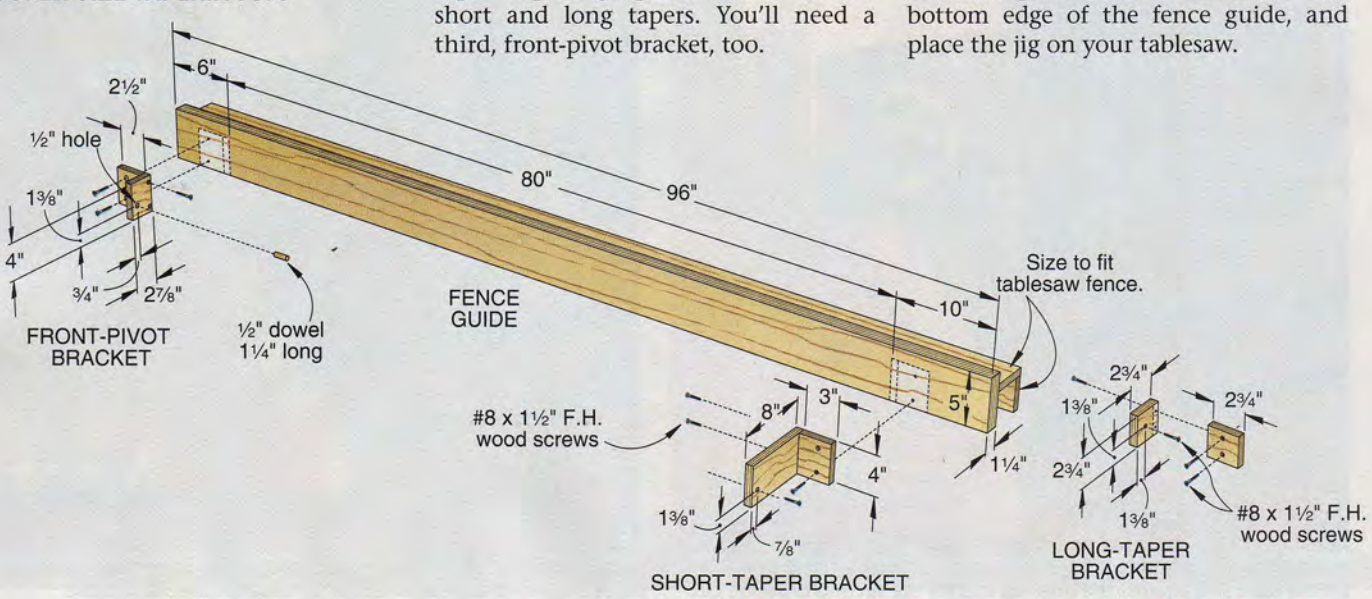
You could lengthen the adjustable jig to hold almost any size workpiece—even the four 80"-long, 2¾"-thick posts of the pencil-post bed on *page 24*. But you'd seldom need that capacity, and the jig would be cumbersome to use and impossible to store. You're better off tailoring a jig to taper large blanks.

Start by jointing and planing a 2×6 that's about 16" longer than your workpiece to 1¼×5". (We've sized the jig shown for the pencil-post bedposts.) From hardwood or ¾" plywood, make and attach a saddle that captures your tablesaw fence [**Drawing 2**].

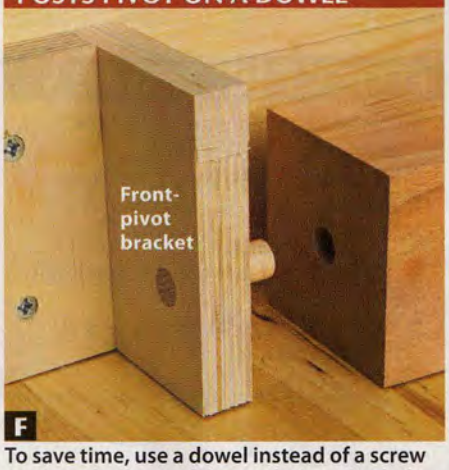
The bedposts have two tapers—short ones at their feet and long ones at their tops—requiring separate brackets for the short and long tapers. You'll need a third, front-pivot bracket, too.

From ¾" plywood, cut, glue, and screw together the three brackets, as shown. Mark the pivot-dowel or screw location on each bracket at a distance above the saw table that's half the thickness of the workpiece (1⅜" for the 2¾" square bedpost). The front-pivot dowel should position the workpiece to provide 1" of clearance from the fence guide. Mount the front-pivot bracket flush with the bottom edge of the fence guide, and place the jig on your tablesaw.

2 SUPER-SIZE TAPERING JIG



POSTS PIVOT ON A DOWEL



To save time, use a dowel instead of a screw to pivot the front of the workpiece. Both the short and long brackets on the opposite end keep the post from pulling free.

BRACKETS POSITION POSTS

Mount the short-taper bracket to the tapering-jig fence guide so the long bracket leg fits tight against the workpiece end. The pivot screw holds it in place.

CUT THE SHORT TAPERS FIRST

When cutting short tapers, the square portion of the bedpost rests flat on the saw table. Note that the post was mortised and drilled before tapering.

To tailor the short- and long-taper brackets for the workpiece tapers you want, first mark taper lines on your workpiece. Drill a ½" hole centered in the end of the workpiece; then place the front-pivot bracket dowel in that hole [**Photo F**]. Slide the other workpiece end until the marked taper line parallels the fence guide. Measure from the center of the workpiece end to the fence guide, and drill the end for the pivot screw at that distance. Now screw that bracket to the fence guide to provide a snug fit for the workpiece.

Start with the short tapers

Attach the short-taper bracket to the fence guide, and then screw the leg to the bracket [**Photo G**]. To help control the jig, position infeed and outfeed supports in front and back of your tablesaw.

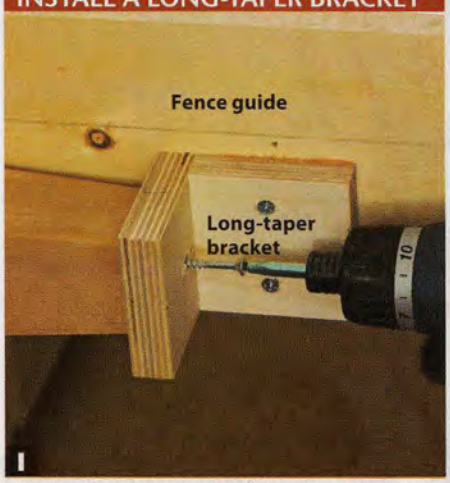
By tapering the foot of the post first, those tapers provide clearance later for long cuts using the long-taper bracket. Cut the first taper for the foot of the post [**Photo H**]. Then remove the screw, rotate the workpiece 90°, and reinsert the pivot screw. Make the second taper, followed by two more to complete the bedpost foot. Repeat for the remaining posts.

Tackle long tapers

To cut the long tapers, first replace the short-taper bracket with the long-taper bracket. Screw the foot end of the post to the bracket [**Photo I**].

Now move the fence to align the workpiece taper lines with the blade, and add both an infeed and outfeed support. Cut the first taper [**Photo J**], and then rotate the workpiece 90°, keeping an untapered edge against the saw table for the next taper. Repeat for one additional taper, and rotate the workpiece again for the final pass.

INSTALL A LONG-TAPER BRACKET



Cutting the short tapers first allows the post to ride close to the fence guide when cutting long tapers using the smaller bracket.

For the final taper, you no longer have a workpiece edge flat against the saw table. That can allow the workpiece to spin between the centers at the start of the taper when the square section no longer rests on the saw table. To keep the workpiece flat and reduce vibration, double-face-tape a cutoff wedge to the underside of the workpiece to re-create a flat surface flush with the bottom edge of the jig [**Photo K**]. Remount the jig on your fence, and cut the final taper.

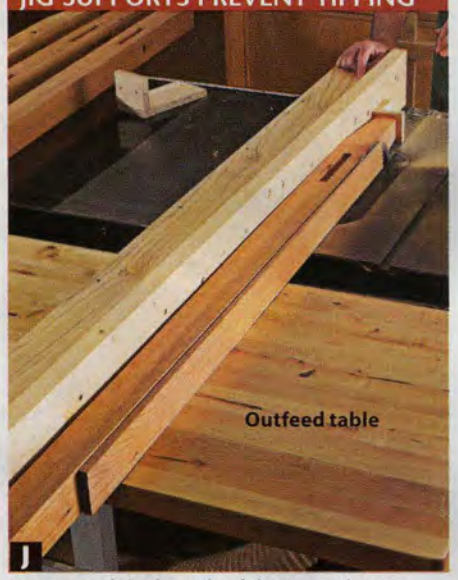
Then find a home in your shop for this jig. By customizing the brackets, you can use it again for the oversize tapered parts on your next project.

Sources

Hold-down. Kreg Trak Clamp with bolt and knob, #145831, $5, Woodcraft, 800-225-1153 or woodcraft.com.
Four-arm knob. With through hole and ¼"-20 insert, #142230, $2, Woodcraft.

Written by **Bob Wilson** with **Chuck Hedlund**
Illustrated by **Roxanne LeMoine; Lorna Johnson**

JIG SUPPORTS PREVENT TIPPING



Because of the length of the jig and parts, good infeed and outfeed supports are critical when cutting the long tapers. We used a workbench for infeed support and a table for outfeed support to stabilize the jig and workpiece when cutting long tapers.

STABILIZE THE WORKPIECE

Before cutting the final taper, double-face tape a cutoff wedge to the workpiece flush to the bottom jig edge. This stops the workpiece from rotating as it's cut.

Easy-to-make-and-fit drawers
See *page 38*.

Don't sweat the tapered legs
See *page 32*.

Pretty, Practical Nightstand

Tapered legs lend this nightstand a lithe look, and two generous drawers make it a practical bedside table. Build it on its own or as a companion to the pencil-post bed (*page 24*).

PROJECT HIGHLIGHTS

- Overall dimensions are 23" wide × 19½" deep × 26¾" high.
- Materials needed: Cherry, birch plywood.

Skill Builders

- Learn how to taper two adjacent sides of a leg.
- Build a case with wide mortise-and-tenon joints.

The perfect complement to the pencil-post bed (*page 24*), this nightstand is both beautiful and easy to build. For a complete bedroom suite, plan to build the dresser with valet and mirror in issue 188 (December 2008/January 2009) and the lingerie chest in issue 189 (March 2009).

Start with the legs

1 Cut the legs (A) to size [**Materials List**, *page 39*]. (We used solid stock, but you could laminate two ¾"-thick boards for the legs.)

2 Lay out the mortises on the legs (A) [**Drawing 1**]. The front legs differ from the back ones; lay out two of each.

3 Form the mortises with a mortising machine or by drilling a series of ¼" holes with a drill press [**Photo A**]. Clean the sides and square the ends with ¾" and ¼" chisels.

4 Lay out the tapers on the two *inside* faces of the legs (A) [**Drawing 1**]. Draw pencil lines on the bottom of the leg to divide it into quarters, and mark the quarter adjacent to the two outside faces, which remain straight, with an X.

5 Cut the two tapered sides of the leg (A) on a tablesaw with a tapering jig [**Photos B, C**]. To cut them on a jig like the one shown, align the taper along the edge of the jig base. Slide the fence up to the leg and secure it. Clamp the leg to the fence. (See *pages 32–35* for more about cutting tapers.)

6 Sand the tapered edges to remove the saw marks. Then, finish-sand the legs (A) to 220 grit.

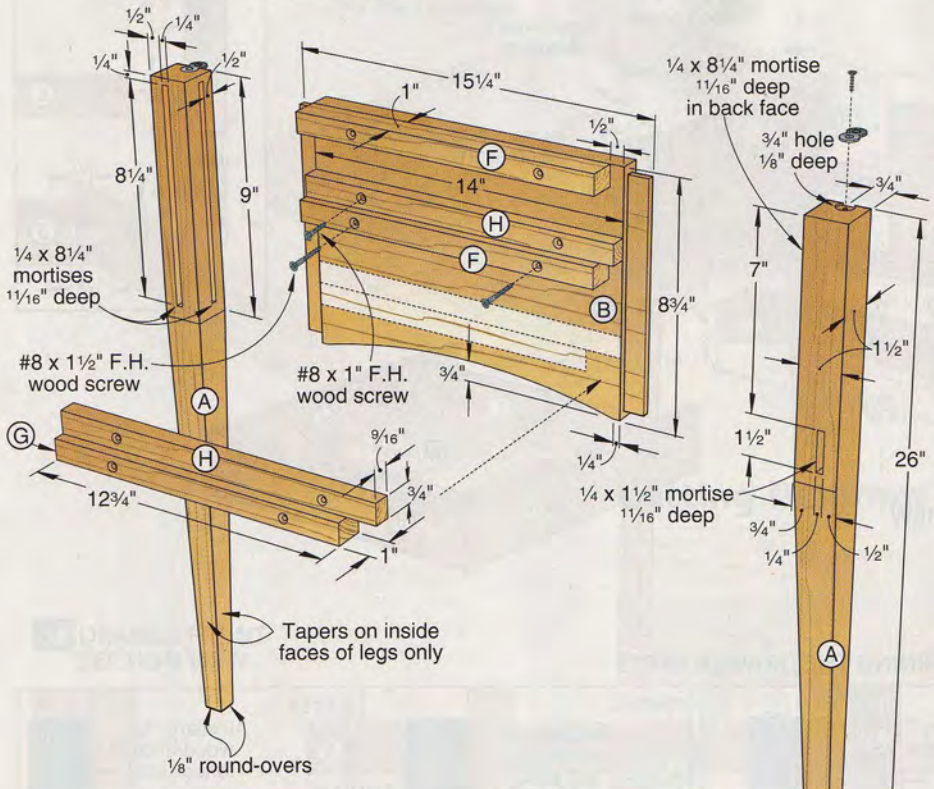
The aprons are next

1 Cut the side aprons (B), front apron (C), and back apron (D) to size.

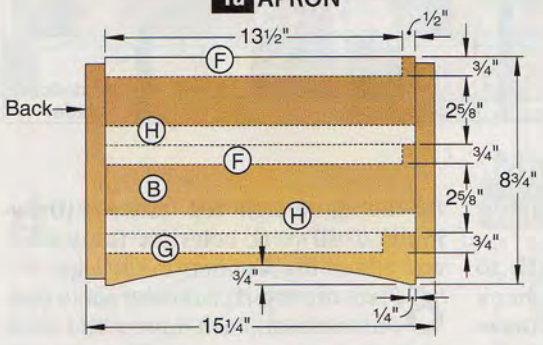
2 Lay out the tenons on all four aprons (B, C, D) [**Drawing 2**].

3 Cut the tenons with a tablesaw and ¾" dado set, in a setup similar to the one shown in **Photos I** and **J** on *page 28*.

1 SIDE ASSEMBLY
(Right inside face shown)



1a APRON



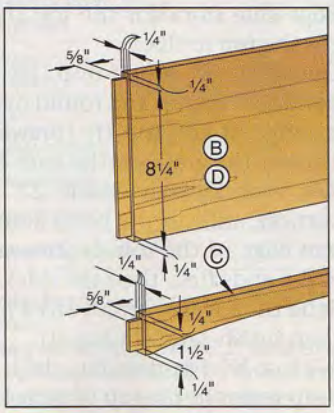
4 Lay out the arches on the side (B) and front (C) aprons [**Drawings 1a, 3**]. Draw the arches through the endpoints and centerpoint using a fairing stick. (For a free fairing stick plan, go to woodmagazine.com/fairing.)

5 Bandsaw the arches slightly outside the line, and then sand to the line. Finish-sand the aprons (B, C, D).

6 Glue and clamp a front and rear leg (A) to each end of each side apron (B) [**Drawing 1**], keeping the tops of the legs and the apron flush.

7 Glue and clamp the side assemblies (A/B) to the front apron (C) and back apron (D) [**Drawing 3**].

2 APRON TENON DETAIL



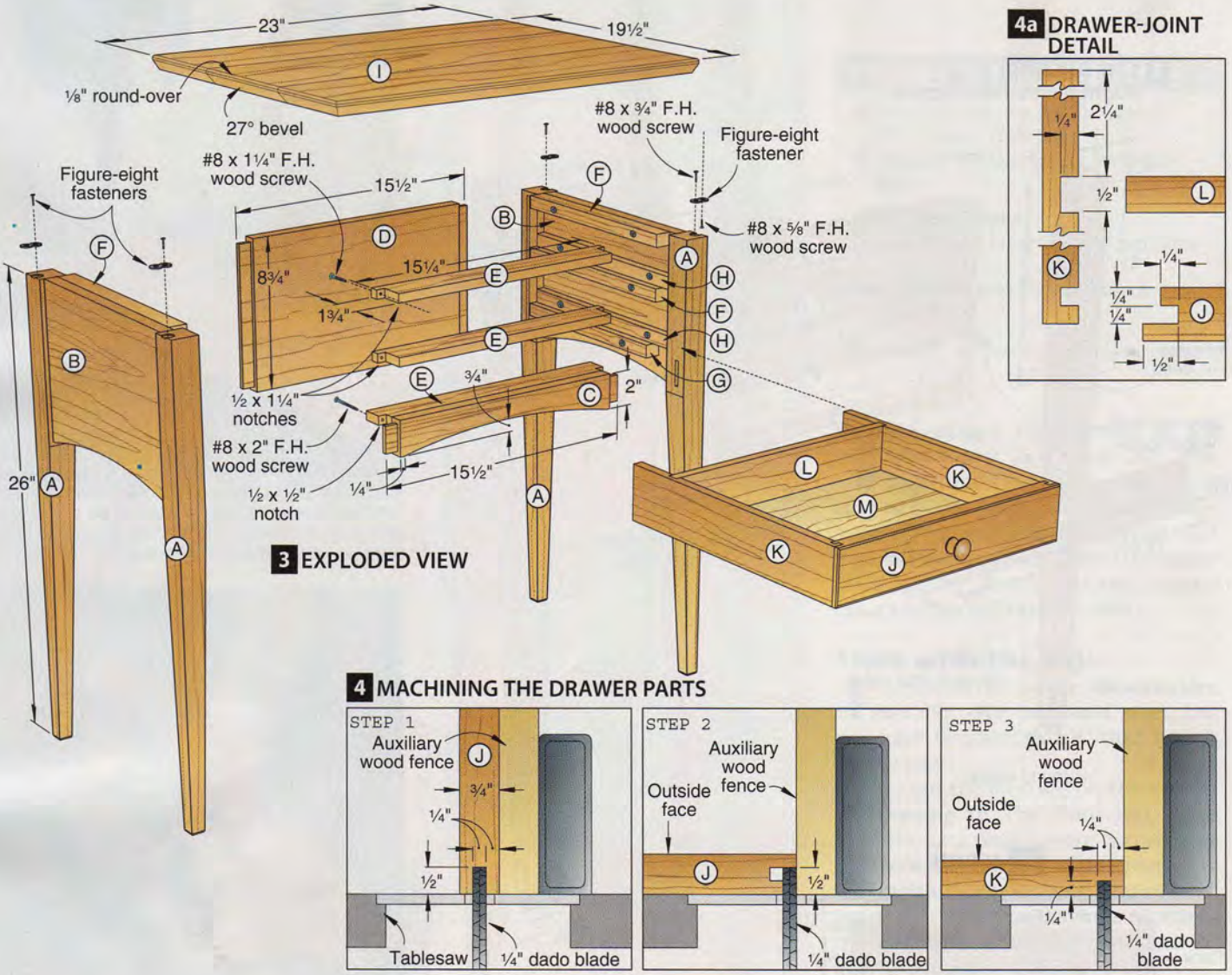
A MORTISE THE LEGS

Set the drill-press fence and depth stop, and drill spaced holes for the mortise. Then drill out the waste between the holes.

B

C TAPER THE LEGS

Cut tapers on the mortised faces of the legs (A). Make the first cut with the marked quadrant of the foot against the jig fence and on top [Photo B]. Make the second cut with the flat side of the leg on the jig base and the marked quadrant against the fence [Photo C].



Make the drawer openings

1 Cut the front rails (E) to size. Bandsaw ½×1¼" notches on the ends of the two top rails and ½×½" notches on the bottom one [**Drawing 3**].

2 Drill and countersink shank holes in the back edge of the front rails (E) [**Drawing 3**]. (For #8 screws, drill 5/32" shank holes and 7/64" pilot holes.)

3 Glue and clamp the lower rail (E) flush with the top edge of the front apron (C). Drill pilot holes and drive screws into the legs (A).

4 Cut four 2⅜" temporary spacers; then dry-assemble the upper and middle rails (E) with the spacers [**Photo D**]. Ensure that the upper rail sits flush with the top of the side assembly (A/B). Glue and clamp the rails, drill pilot holes, and drive the screws.

5 Cut the upper (F) and lower drawer supports (G) to size. Drill and countersink shank holes 2" from each end [**Drawing 1**]. Using the temporary spacers, screw the supports to the side aprons (B) [**Drawing 1a, Photo E**].

6 Cut the drawer side spacers (H) to size. Drill and countersink shank holes centered 2" from each end [**Drawing 1**]. Position the spacers on the side aprons (B) [**Drawing 1a**], drill pilot holes, and drive the screws [**Photo F**].

Top it off

1 Edge-glue stock for the top (I), and cut the top to size.

2 Chuck a ⅛" round-over bit in a handheld router, and round over the upper edge of the top (I) [**Drawing 3**]. Rout across the grain on the ends first.

3 Tilt your tablesaw blade 27° from vertical, and cut the bevel along the bottom edge of the top (I) [**Drawing 3**]. Bevel the ends first, then the sides.

4 Sand the edges to remove tool marks; then finish-sand the top (I).

5 With a ¾" Forstner bit, drill a ⅛"-deep recess in the top of each leg (A) for the figure-eight top fasteners [**Drawing 1**]. Drill pilot holes for the screws, and attach the fasteners to the legs.

6 Place the top (I) facedown on a padded surface. Then invert the table assembly on it, centered, and mark locations on the underside of the top for the figure-eight fastener screws. Carefully drill pilot holes, then drive the screws.

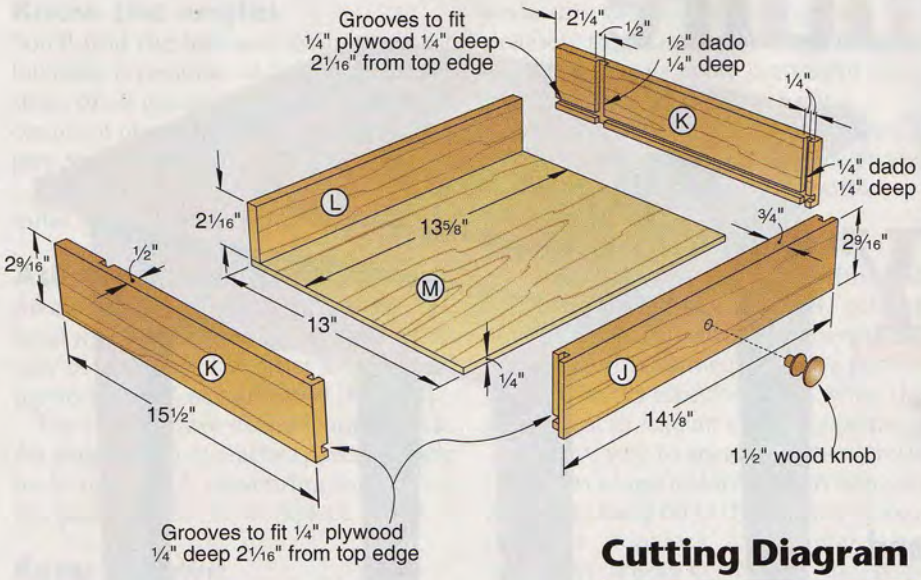
Build a pair of drawers

1 Cut the drawer fronts (J), sides (K), backs (L), and bottoms (M) to size [**Drawing 5**].

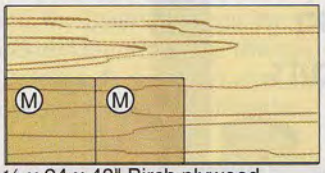
2 Refer to **Drawings 4** and **4a** to machine the drawer fronts (J) and sides (K). Cut a 1/16" rabbet along the bottoms of the drawer fronts [**Drawing 5a**]. Drill the knob holes.

3 Cut the ½" dado in the drawer sides (K) [**Drawing 4a**] to receive the drawer back (L). Then cut grooves in the front (J) and sides to hold the bottom (M) [**Drawing 5**].

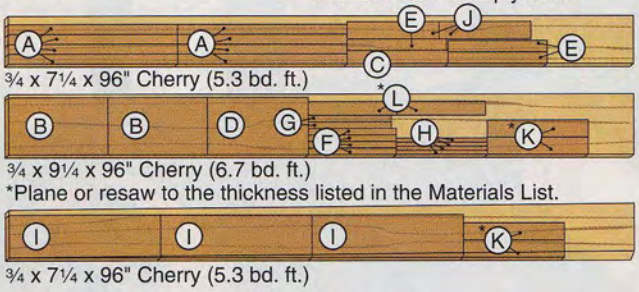
5 DRAWER



Cutting Diagram



¼ x 24 x 48" Birch plywood



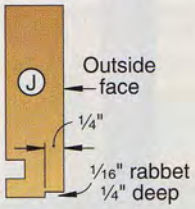
¾ x 7¼ x 96" Cherry (5.3 bd. ft.)

¾ x 9¼ x 96" Cherry (6.7 bd. ft.)

*Plane or resaw to the thickness listed in the Materials List.

¾ x 7¼ x 96" Cherry (5.3 bd. ft.)

5a DRAWER FRONT SECTION VIEW



4 Finish-sand the drawer parts. Glue the drawer fronts (J) and backs (L) to the sides (K) [**Drawing 5**]. Slide the bottoms (M) into the grooves in the sides and fronts, but do not glue them. Square the drawers, and clamp. Attach the bottoms to the backs with wire nails.

Finish your nightstand

1 Inspect the assemblies and touch up the finish-sanding as necessary.

2 Stain as desired. (We applied Minwax no. 607 Cherrywood gel stain to match the bed.)

3 Apply a clear finish. (We applied three coats of satin polyurethane, sanding to 320-grit between coats.)

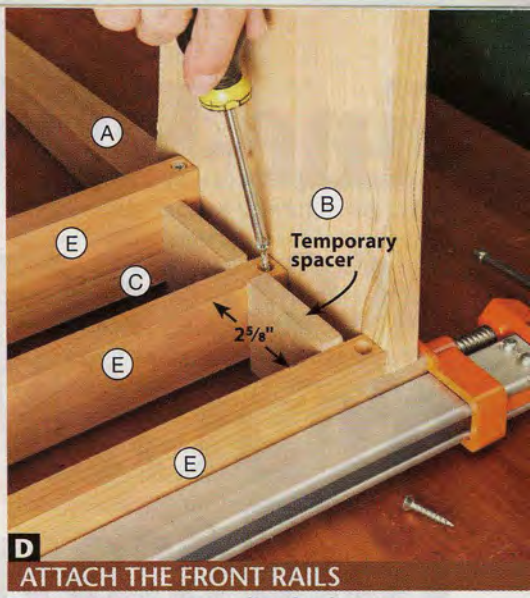
4 Install the drawer knobs. Then slide the drawers into place.

Written by **Larry Johnston** with **Chuck Hedlund**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	legs	1½"	1½"	26"	C	4
B	side aprons	¾"	8¾"	15¼"	C	2
C	front apron	¾"	2"	15½"	C	1
D	back apron	¾"	8¾"	15½"	C	1
E	front rails	¾"	1¾"	15¼"	C	3
F	upper drawer supports	¾"	1"	13½"	C	4
G	lower drawer supports	¾"	1"	12¾"	C	2
H	drawer side spacers	9⁄16"	¾"	14"	C	4
I	top	¾"	19½"	23"	EC	1
J	drawer fronts	¾"	2 9⁄16"	14 1⁄8"	C	2
K	drawer sides	½"	2 9⁄16"	15½"	C	4
L	drawer backs	½"	2 1⁄16"	13 5⁄8"	C	2
M	drawer bottoms	¼"	13"	13 5⁄8"	BP	2

Materials key: BP–birch plywood, C–cherry, EC–edge-glued cherry.
Supplies: #8 x 5⁄8", ¾", 1", 1¼", 1½", 2" flathead wood screws, figure-eight fasteners (4), 1½" wooden knobs (2).
Blade and bits: ⅛" round-over bit, rabbeting bit, dado set.

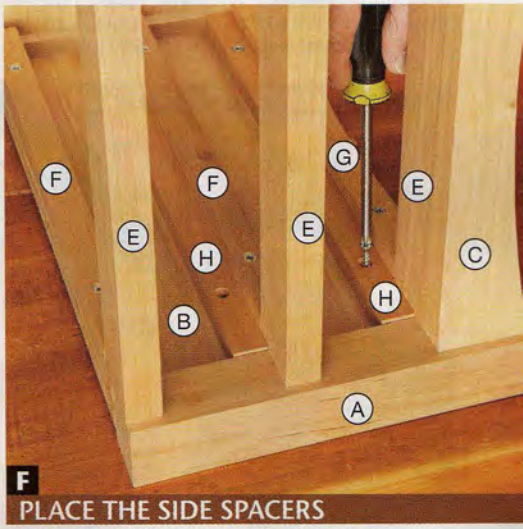


D ATTACH THE FRONT RAILS

Temporary spacers equalize the distance between the front rails (E) so the drawer openings will be the same height.

E ADD THE DRAWER SUPPORTS

Attach the top drawer support (F) flush with the top of the side apron (B). Use spacers to position the rest of the supports (F, G).



F PLACE THE SIDE SPACERS

The drawer side spacers (H) center the drawers side-to-side. Place them against the top of the middle and lower supports (F, G).

Fine-Furniture Accuracy from *ANY* Tablesaw

Even old hand-me-down saws and low-cost benchtop machines can produce clean, on-the-money cuts. We'll show you how.

It's all about the setup

Know the angles

You'll find the best and least expensive tablesaw accessories at an office supply store, of all places. Invest about $10 in a couple of plastic drafting triangles. They give you perfect 90°, 45°, 60°, and 30° corners for setting blade angles and miter angles [**Photos A** and **B**].

Ask for an extension

An extension screwed to the miter-gauge head will improve the quality and accuracy of your cuts. Use a flat length of ¾" plywood, MDF, or hardwood [**Photo C**].

The extra surface steadies longer stock. An extension that reaches past the blade backs up the cut, preventing tear-out on the back edge of the workpiece.

Keep it down

If your benchtop saw won't accept a dado blade to cut a rabbet, you need to make a series of cuts and nudge the fence over slightly between passes. The trick with this method is getting each cut precisely the same depth. **Photo D** shows a simple way to apply consistent pressure downward during each pass.

And here's a bonus tip: Use a rip blade for the best results. Its square-profile raker teeth cut a smooth, flat bottom.

Be sneaky; then stop it

It's often smart not to cut to finished size on the first pass. Instead, cut the workpiece slightly oversize; then sneak up on the final dimension for a perfect fit. This works especially well when the piece must fit into an existing opening.

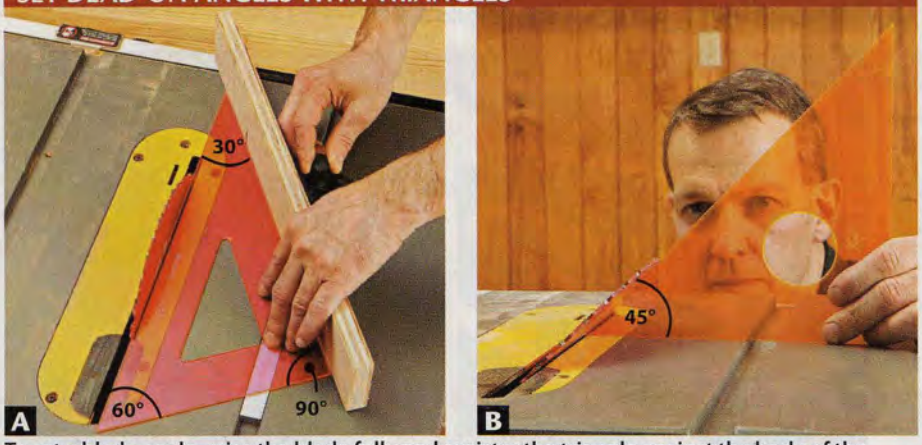
An easy way to sneak up when crosscutting is to use a stopblock. When you can safely hang on to the "keeper" piece, clamp a stopblock to a miter-gauge extension [**Photo C**]. Nudge the stopblock toward the blade between cuts to get to the desired length. Once the stopblock is positioned, you can cut any number of pieces to identical lengths.

For keeper pieces too short to hang on to, attach the stop to the rip fence [**Photo E**]. The stop creates space for the cutoff to rest safely between the blade and fence without being kicked back. Cut test pieces until you have the rip fence and stopblock set properly.

Cutting sheet goods to size can be a challenge on any size saw. Make the initial cut about ⅛" oversize. This reduces the size of the sheet and makes it easier to handle. Then reposition the rip fence to trim the more manageable panel to finished size.

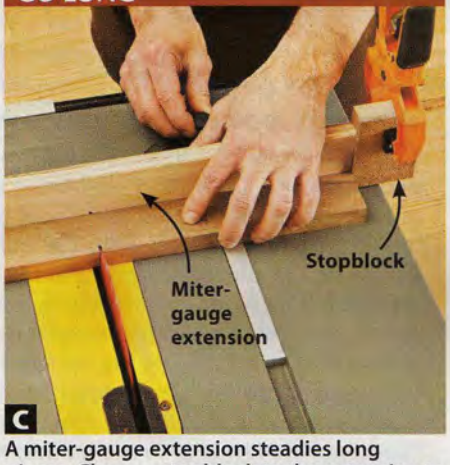
Watch a free video on how to verify tablesaw setups at woodmagazine.com/tssetup

SET DEAD-ON ANGLES WITH TRIANGLES



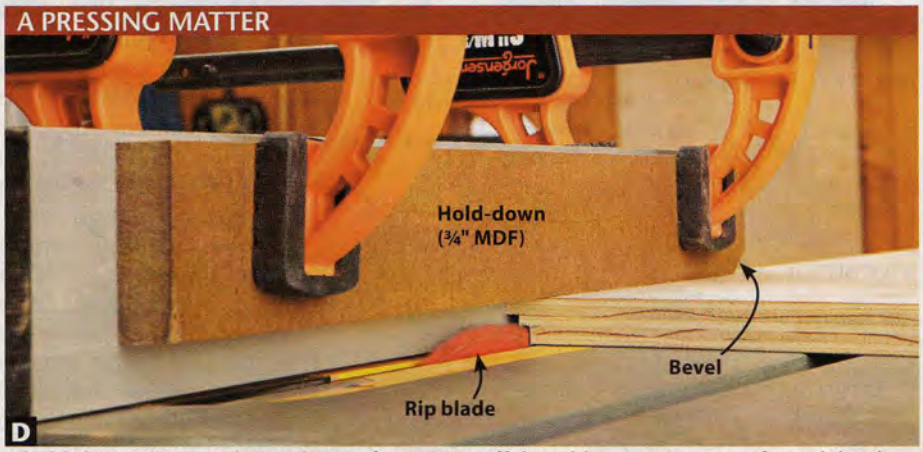
To set a blade angle, raise the blade fully and register the triangle against the body of the blade, not against the teeth. Raising the blade fully gives you the most surface for the triangle to rest against. Lower the blade to the proper cutting height after setting the angle.

GO LONG



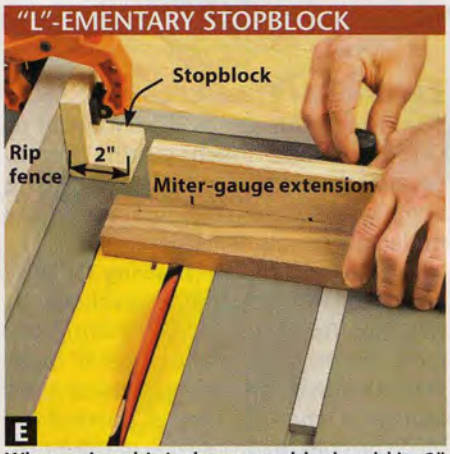
A miter-gauge extension steadies long pieces. Clamp a stopblock to the extension to cut several pieces to identical length.

A PRESSING MATTER



A hold-down prevents the workpiece from rising off the table, ensuring cuts of equal depth. When clamping the hold-down to the fence, use the workpiece as a gauge. Bevel the leading edge of the hold-down to guide the board under it.

"L"-EMENTARY STOPBLOCK



When using this L-shape stopblock, add its 2" length to the desired dimension. Set the rip fence to this new measurement.

4 jigs that put you a cut above

The most useful tablesaw jigs in the *WOOD®* magazine shop: our sleds. Each carries a workpiece past the blade to make a precise cut. We build them precisely, ensuring perfect 90° crosscuts and 45° miters every time. Each of these sleds consists of a base guided by one or two miter-slot guides that fit into the miter-gauge slots.

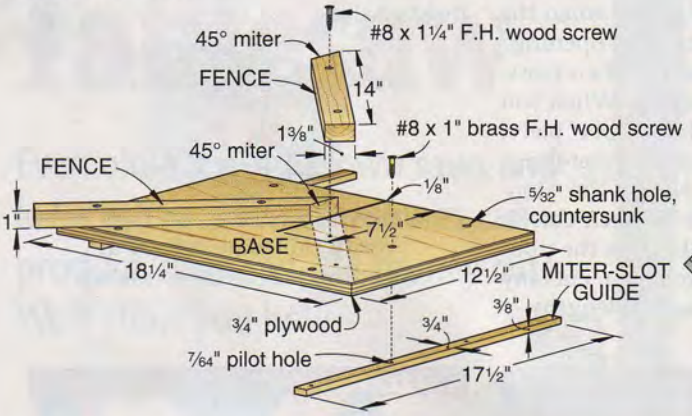
Mighty miter sled

Setting up perfect miter cuts can be time-consuming. With a miter sled, you do it only once, when building the sled.

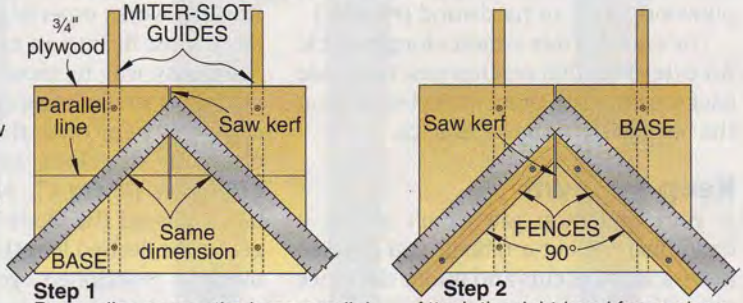
Cut the pieces for the miter sled to the dimensions shown in **Drawing 1**. After attaching the miter-slot guides, as shown in the **Shop Tip** *below*, put the jig on the tablesaw and cut a kerf 7½" into the base. Then follow the steps in **Drawing 2,** and use double-faced tape to temporarily attach the fences.

Test your setup by miter-cutting four pieces to identical length and dry-fitting them together as a frame. Check for a tight joint at all four corners. If needed, adjust the fences. Then screw them down in their final positions.

1 MITER SLED



2 INSTALLING THE MITER FENCES



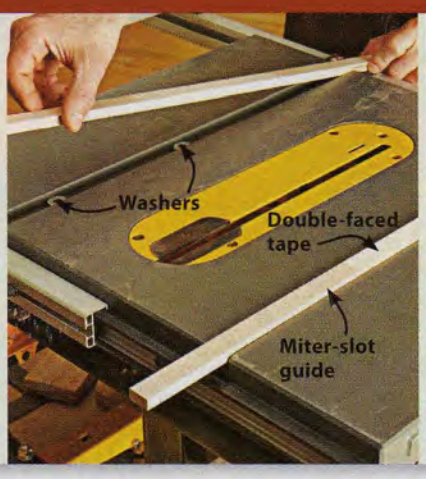
Step 1
Draw a line across the base parallel to its front edge. Center the inside corner of a framing square on the kerf and rotate it until the same dimension on both legs of the square intersects the parallel line.

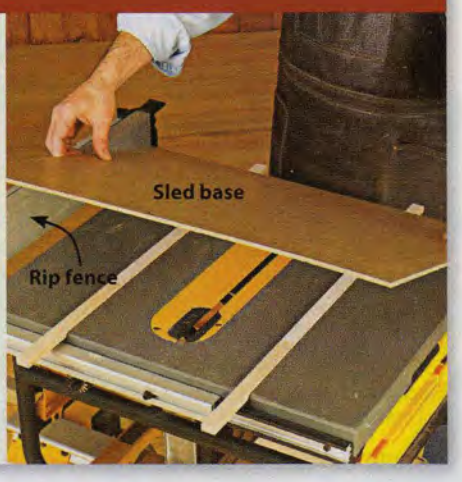
Step 2
Attach the right-hand fence along one leg of the framing square and the left face against the other.

SHOP TIP

Washers ease guide placement

To precisely mount miter-slot guides to a sled, first place a couple of washers in each miter-gauge slot. Then set the guides on top of them, as shown at *right*. The guides should sit just above the surface of the tablesaw. If they don't, add another washer or two. Put a strip of double-faced tape on top of each guide. Use the rip fence to help squarely position the base as you lower it onto the guides, as shown at *far right*. Press the base firmly onto the guides; then carefully remove the base with the guides attached. Now screw the guides in place.



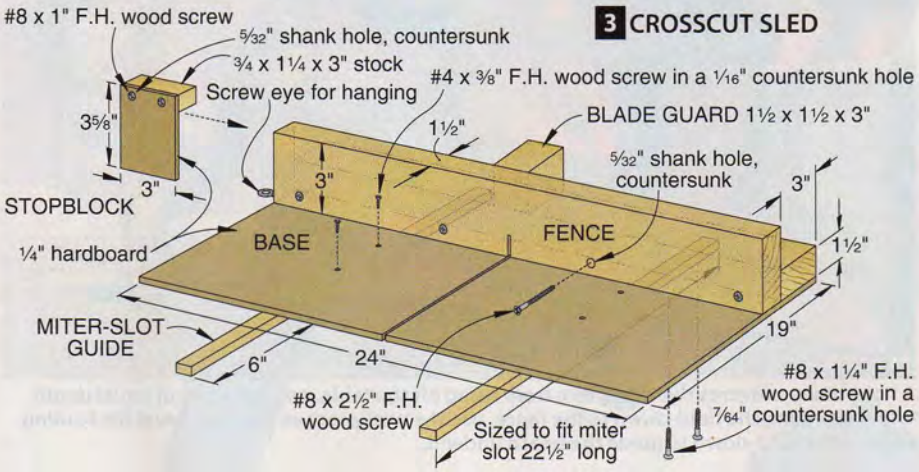


Zero-clearance crosscut sled

The base of this sled is ¼" hardboard so you don't lose much cutting depth. Because there's no gap between the base and blade, it yields chip-free cuts on the underside of your workpiece.

Cut the base to size [**Drawing 3**]. Then attach the miter-slot guides, as shown in the **Shop Tip** *above*. After attaching the fence, set the saw blade just over ¼" high. Place the jig on the saw and make a cut that stops when the highest point of the blade reaches the front edge of the fence. Glue the blade guard to the rear of the fence in line with the saw kerf.

3 CROSSCUT SLED



Joinery jig

Tight-fitting joints are a snap on any saw when using this jig. Use it to cut tenons, half-laps, and bridle joints [**Drawing 4**].

Start by cutting a 16⅛×10" blank for the stationary and sliding bases [**Drawing 5**]. Cut grooves the length of the blank for the keys; then divide the blank into 8×10" pieces.

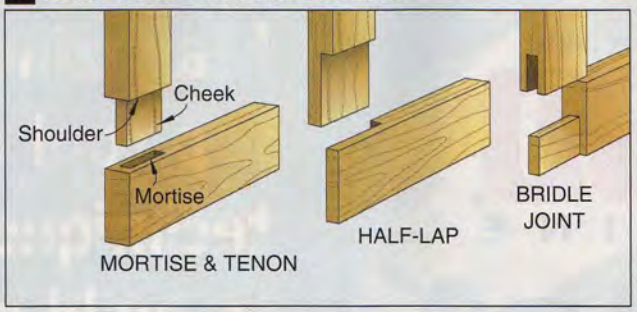
To make the slots for the locking knobs, drill a series of holes in the sliding base centered over each dado. Remove the remaining waste and smooth each slot with a chisel. Then glue and screw the brace and face to the sliding base. Make certain the face and base are perpendicular.

Cut the keys from hardwood to fit the dadoes. Dry-fit the bases together with their edges flush and the keys in the dadoes. Make a mark on each key by pressing an awl through each slot at the end closest to the blade. Drill holes at these marks and countersink the bottom of the hole. Then use epoxy to secure the machine screws in their holes. Now you can glue the keys into the dadoes in the stationary base.

Position the miter-slot guide, as shown in the **Shop Tip** *opposite*. Assemble the sliding and stationary bases so the machine screws are at the end of the slots farthest from the blade. Position the sliding base against the blade and bring the rip fence up to help square up the opposite edge of the jig. Press the jig onto the miter-slot guide, then lift the jig and screw the guide in place.

To cut tenons or half-laps, see **Photo F**. For a bridle joint, cut the tenon first. Then to make the open mortise, position the jig to make a cut roughly centered on the thickness of the workpiece. Make a cut, flip the workpiece face for face, and make another cut. Move the sliding base away from the blade and repeat the process until the joint fits together snugly.

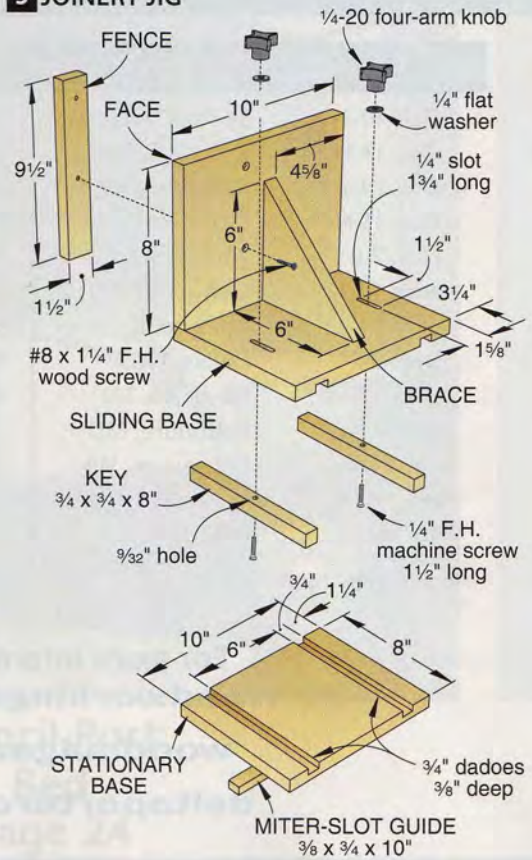
4 THREE HARD-WORKING JOINTS



TWO-CUT TENONS OR HALF-LAPS

A kerf establishes the shoulder of the tenon or half-lap. Adjust the blade and position the jig to make an intersecting cut.

5 JOINERY JIG



No-tilt bevel sled

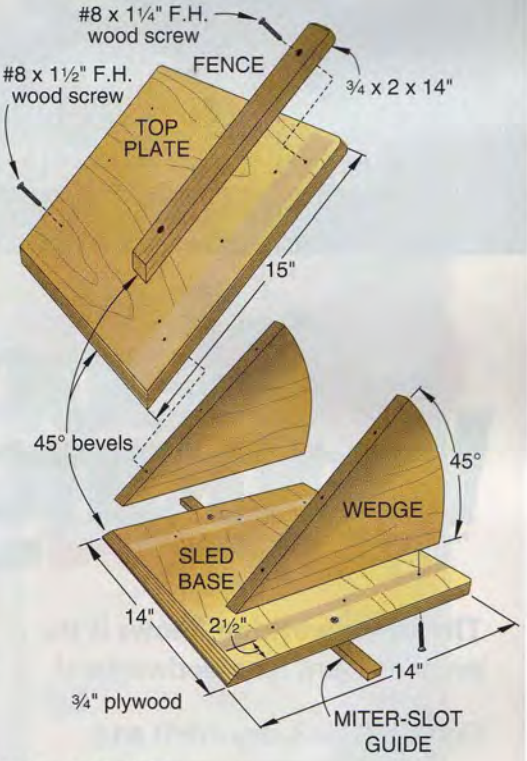
The jig shown in **Drawing 6** helps you cut precise 45° bevels without having to tilt the blade — a real advantage on a benchtop saw where fine-tuning blade tilt can be difficult.

Start by cutting the 45° bevel along one edge of the sled base. Return the blade to 90° and place the miter-slot guide into the miter slot, as shown in the **Shop Tip** *opposite*. Butt the beveled edge of the base against the body of the blade, then remove the base and screw the miter-slot guide in place.

Attach the wedges using the beveled edge of the base as a guide. Now you can screw the top plate to the wedges and the fence to the top plate. With the blade at 90°, trim the top plate and fence.

To prevent workpieces from sliding down toward the blade during a cut, always clamp the workpiece to the top plate and tight to the fence.

6 BEVEL SLED



Written by **Craig Ruegsegger**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Watch a free video of the miter sled being built at woodmagazine.com/mitersled

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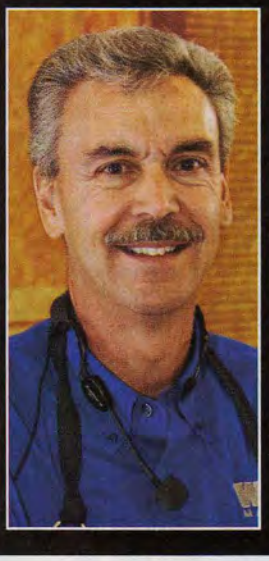

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Nov. 14-17	Denver, CO	March 6-8	Hartford, CT
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Dec. 5-7	Dallas, TX	March 20-22	Charlotte, NC
Dec. 12-14	Nashville, TN	March 27-29	Chantilly, VA
Jan. 2-4	Baltimore, MD	April 3-5	Houston, TX
Jan. 9-11	Milwaukee, WI	April 17-19	Seattle, WA
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Better Homes and Gardens®

WOOD® PATTERNS®

November 2008 *Issue 187*

Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular shaped and intricate project parts. You can machine all other project parts using the Materials List and the drawings accompanying the project you're building.

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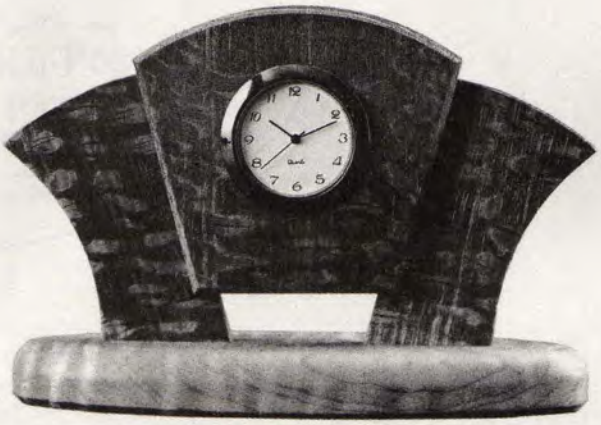

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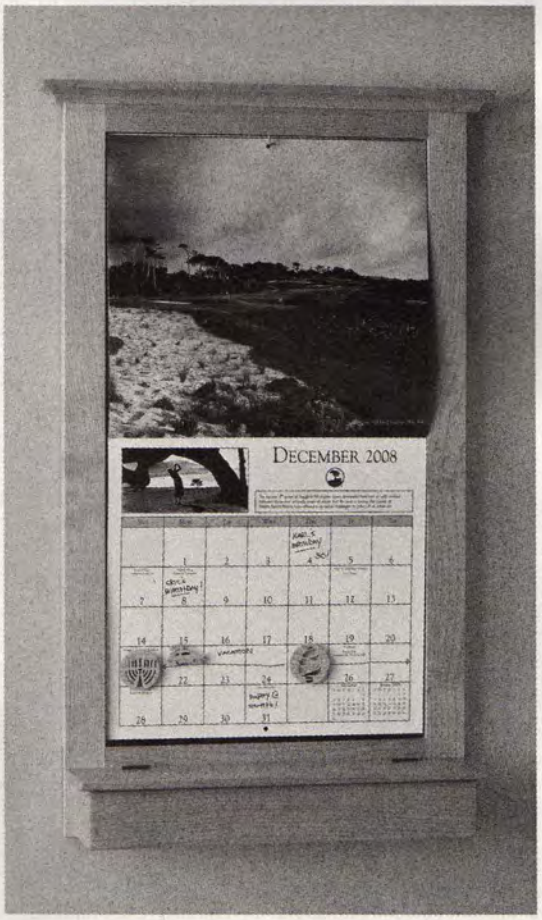

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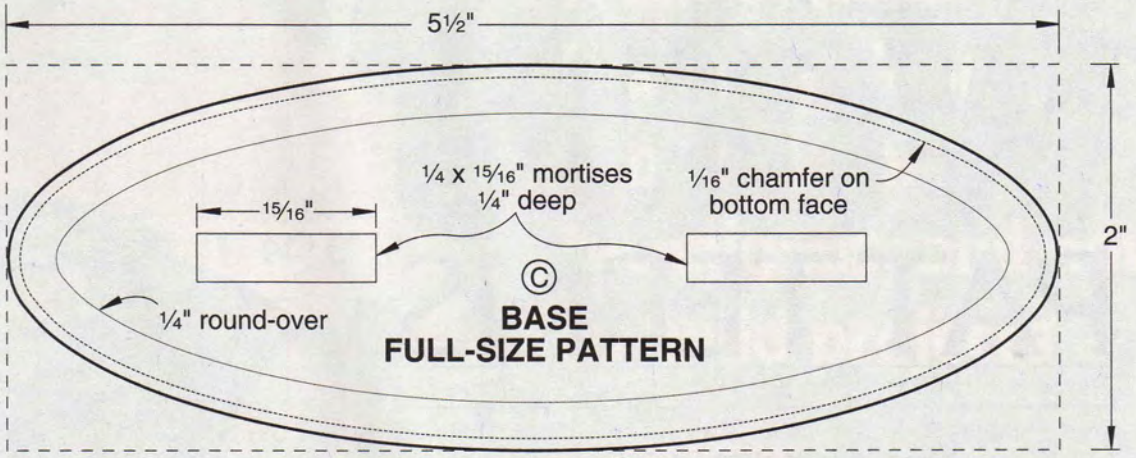

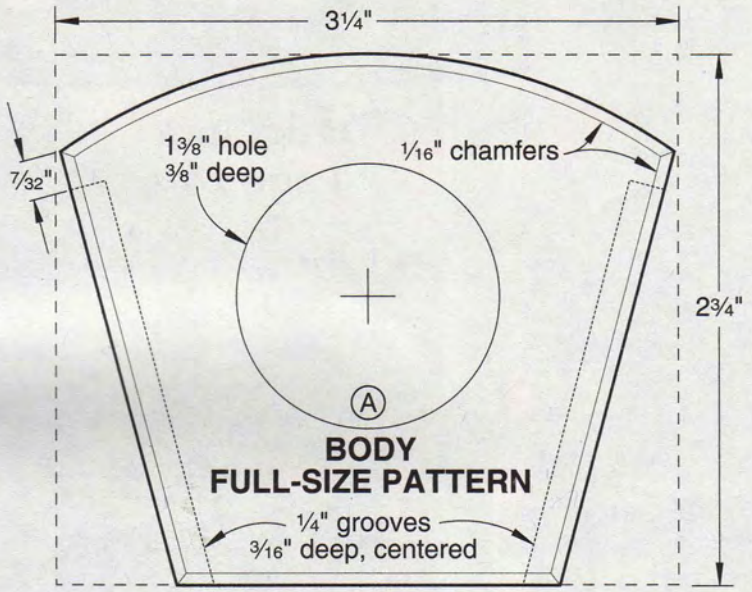

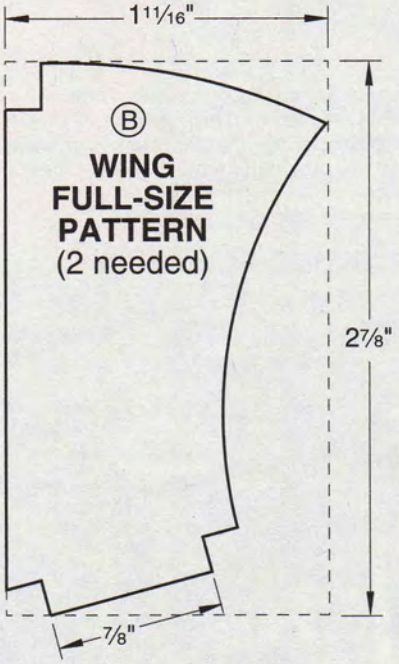

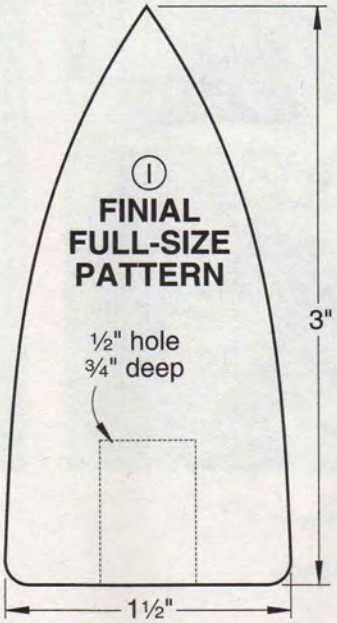

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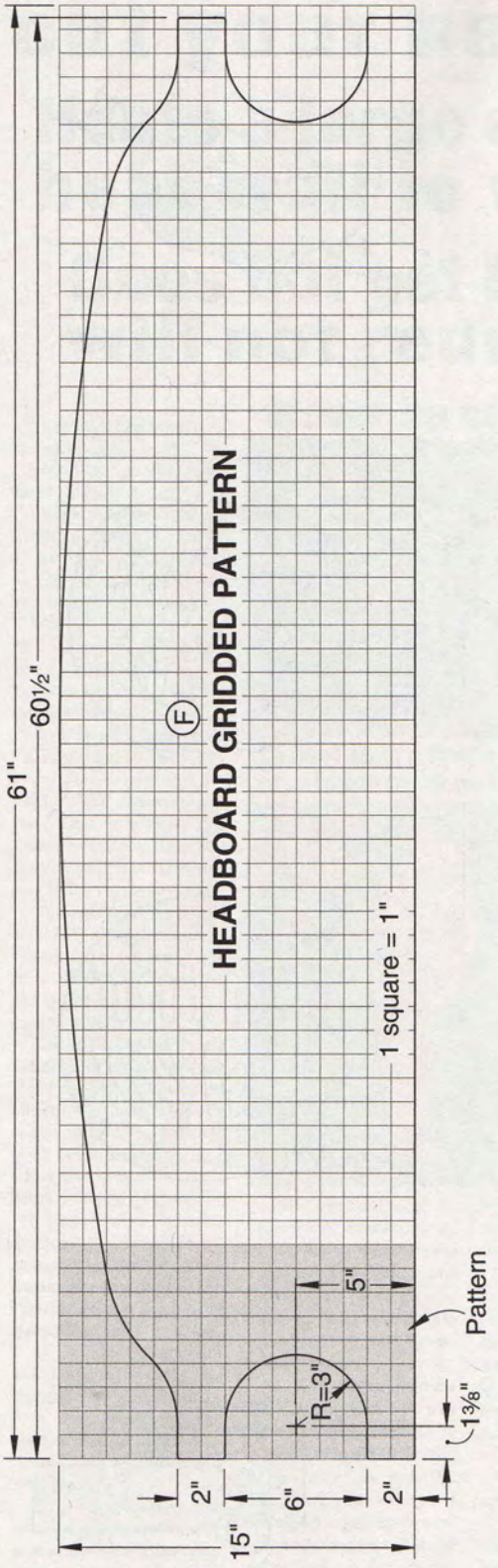

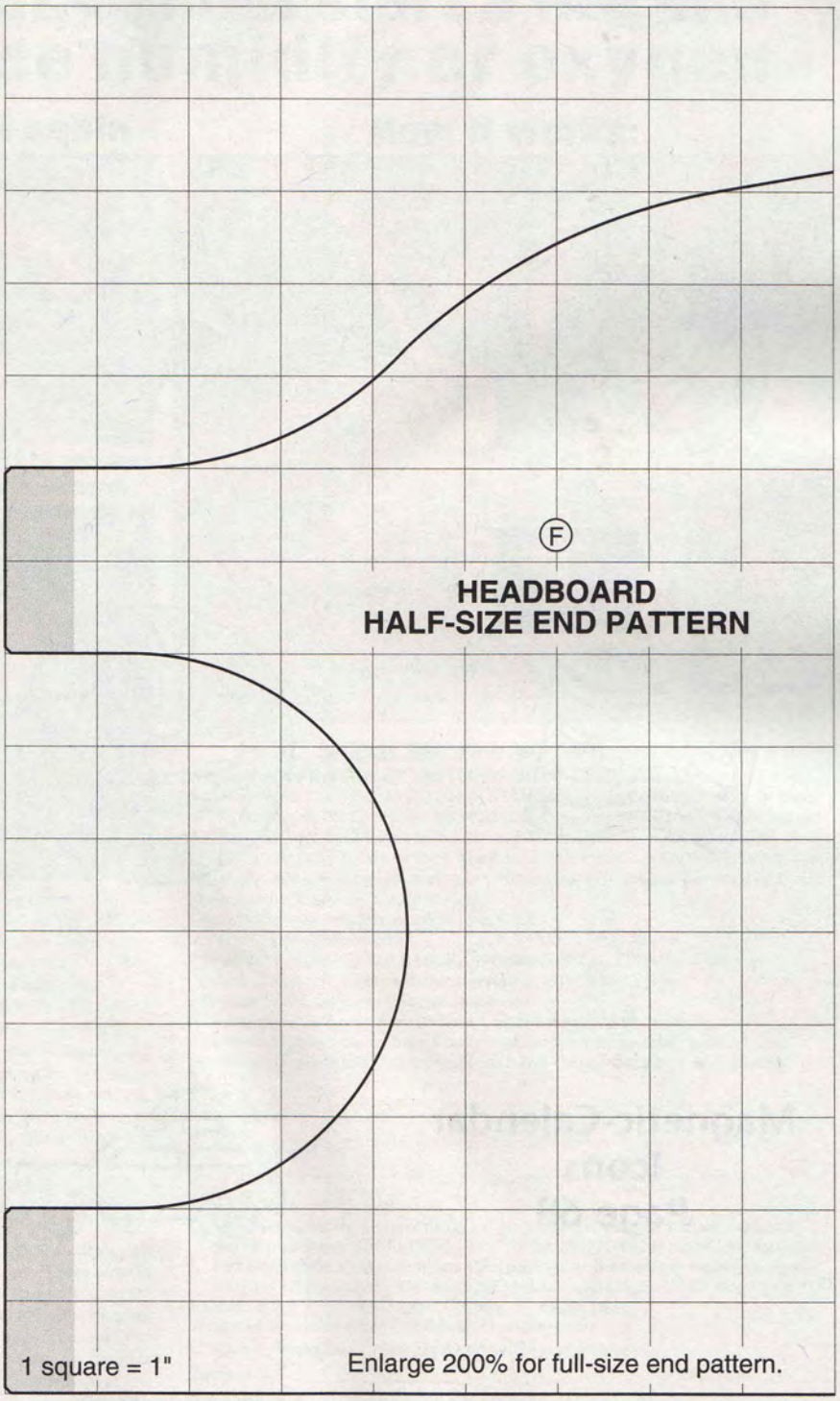

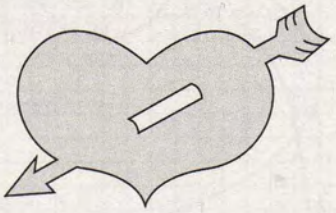

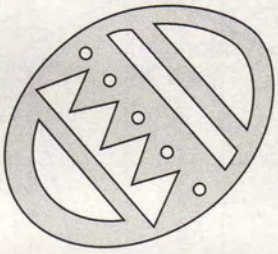

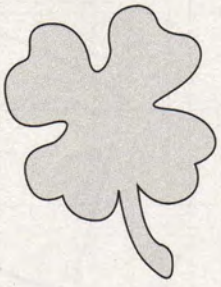

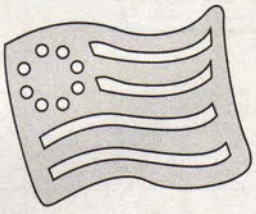

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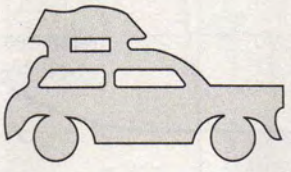

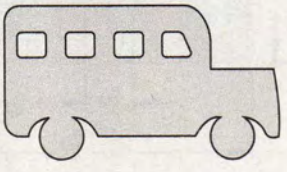

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AS HEARD ON PAUL HARVEY NEWS

New advanced portable heater can cut your heating bill up to 50%

Heats a large room in minutes with even heat wall to wall and floor to ceiling

Does not get hot, cannot start a fire and will not reduce humidity or oxygen

A new advanced quartz infrared portable heater, the EdenPURE™, can cut your heating bills by up to 50%.

You have probably heard about the remarkable EdenPURE™ as heard on Paul Harvey News and on television features across the nation.

The EdenPURE™ can pay for itself in a matter of weeks and then start putting a great deal of extra money in your pocket after that.

A major cause of residential fires in the United States is portable heaters. But the EdenPURE™ cannot cause a fire. That is because the quartz infrared heating element never gets to a temperature that can ignite anything.

The outside of the EdenPURE™ only gets warm to the touch so that it will not burn children or pets. Pets can sleep on it when it is operating without harm.

The advanced space-age EdenPURE™ Quartz Infrared Portable Heater also heats the room evenly, wall-to-wall and floor-to-ceiling. And, as you know, portable heaters only heat an area a few feet around the heater.

Unlike other heating sources, the EdenPURE™ cannot put poisonous carbon monoxide into a room or any type of fumes or any type of harmful radiation.

Q. What is the origin of this amazing heating element in the EdenPURE™?

A. This advanced heating element was discovered accidentally by a man named John Jones.

Q. What advantages does infrared quartz tube heating source have over other heating source products?

A. John Jones designed his heating source around the three most important consumer benefits: economy, comfort, and safety.

In the EdenPURE™ system, electricity is used to generate infrared light which, in turn, creates a very safe heat.

Never be cold again

Cannot start a fire; a child or animal can touch or sit on it without harm

After a great deal of research and development, very efficient infrared heat chambers were developed that utilize three unique patented solid copper heat exchangers in one EdenPURE™ heater.

Q. How can a person cut their heating bill by up to 50% with the EdenPURE™?

A. The EdenPURE™ will heat a room in minutes. Therefore, you can turn the heat down in your house to as low as 50 degrees, but the room you are occupying, which has the EdenPURE™, will be warm and comfortable. The EdenPURE™ is portable. When you move to another room, it will quickly heat that room also. This can drastically cut heating bills, in some instances, by up to 50%.

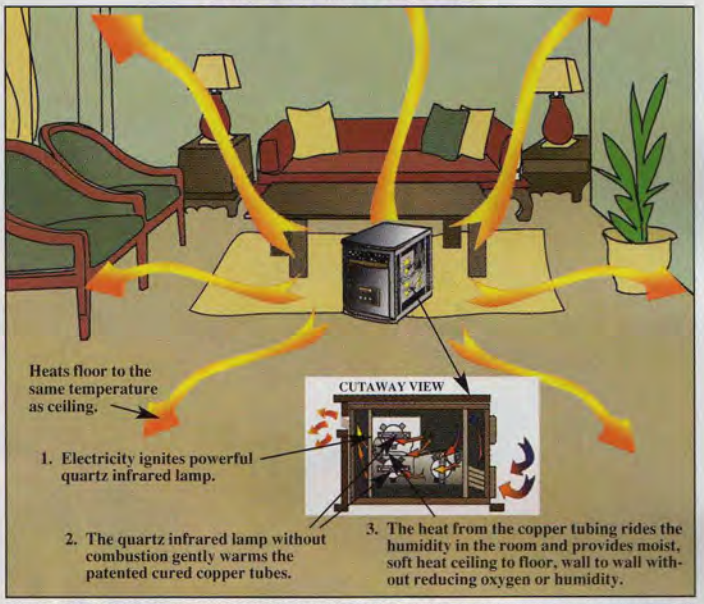
The EdenPURE™ comes in 2 models. GEN3 Model 500 heats a room up to 300 square feet and GEN3 Model 1000 heats a room up to 1,000 square feet.

End of interview.

The EdenPURE™ will pay for itself in weeks. It will put a great deal of extra money in a users pocket. Because of today's spiraling gas, oil, propane, and other energy costs, the EdenPURE™ will provide even greater savings as the time goes by.

Readers who wish can obtain the EdenPURE™ Quartz Infrared Portable Heater at a $75 discount if they order in the next 10 days. Please see the Special Readers Discount Coupon on this page. For those readers ordering after 10 days from the date of this publication, we reserve the right to either accept or reject order requests at the discounted price.

How it works:


Heats floor to the same temperature as ceiling.
CUTAWAY VIEW
1. Electricity ignites powerful quartz infrared lamp.
2. The quartz infrared lamp without combustion gently warms the patented cured copper tubes.
3. The heat from the copper tubing rides the humidity in the room and provides moist, soft heat ceiling to floor, wall to wall without reducing oxygen or humidity.

SPECIAL READER'S DISCOUNT COUPON

The price of the EdenPURE™ GEN3 Model 500 is $372 plus $17 shipping for a total of $389 delivered. The GEN3 Model 1000 is $472 plus $27 shipping and handling for a total of $499 delivered. People reading this publication get a $75 discount with this coupon and pay only $297 delivered for the GEN3 Model 500 and $397 delivered for the GEN3 Model 1000 if you order within 10 days. The EdenPURE™ comes in the decorator color of black with burled wood accent which goes with any decor. There is a strict limit of 3 units at the discount price - no exceptions please.

Check below which model and number you want:

☐ GEN3 Model 500, number _____ ☐ GEN3 Model 1000, number _____

- To order by phone, call TOLL FREE **1-800-588-5608 Ext. EPH8065**. Place your order by using your credit card. Operators are on duty 24 hours, 7 days.
- To order online, log on to www.epheater.com
- To order by mail, by check or credit card, fill out and mail in this coupon.

This product carries a 60-day satisfaction guarantee. If you are not totally satisfied, your purchase price will be refunded. No questions asked. There is also a three year warranty.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

Check below to get discount:

☐ I am ordering within 10 days of the date of this publication, therefore I get a $75 discount and my price is only $297 for GEN3 Model 500 and $397 for GEN3 Model 1000 delivered.

☐ I am ordering past 10 days of the date of this publication, therefore I pay shipping and handling and full price totaling $389 for GEN3 Model 500 and $499 for GEN3 Model 1000.

Enclosed is $_____ in: ☐ Cash ☐ Check ☐ Money Order
(Make check payable to BioTech Research) or charge my:

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SHOP TESTED

Hybrid Tablesaws

These machines combine some of the beefy qualities of 3-hp cabinet saws with the lighter weight and 110-volt convenience of contractor-style saws. You'll find out whether one belongs in your shop, and if so, which model to buy.

Centuries ago, someone bred a horse with a donkey to produce the mule—a hybrid that packs strength and durability into a midsize package. Fast-forward to the late 20th century, when power-tool manufacturers crossbred 3-hp cabinet tablesaws with 1½-hp open-leg contractor saws. The resulting hybrid saws typically look like cabinet saws (with dust- and noise-capturing closed bases) but perform and adjust more like contractor saws. Most hybrid saws are priced between deluxe contractor saws ($700) and bare-bones cabinet saws ($1,200), although two hybrids in this test come in north of the $1,200 mark. So with these machines borrowing features from both "parents," do they really provide you with the best of both worlds?

To find out, we gathered 10 models for head-to-head testing. We also tested two 3-hp cabinet saws that fall into the price range of these hybrids. Using new Freud 10" blades on each saw, we ripped, crosscut, mitered, and beveled solid red oak and birch plywood, just as you would in your own shop. In some respects, we found vast differences between the saws, and in others, it became a toss-up as to which unit performed best. Read on to find out how they fared.

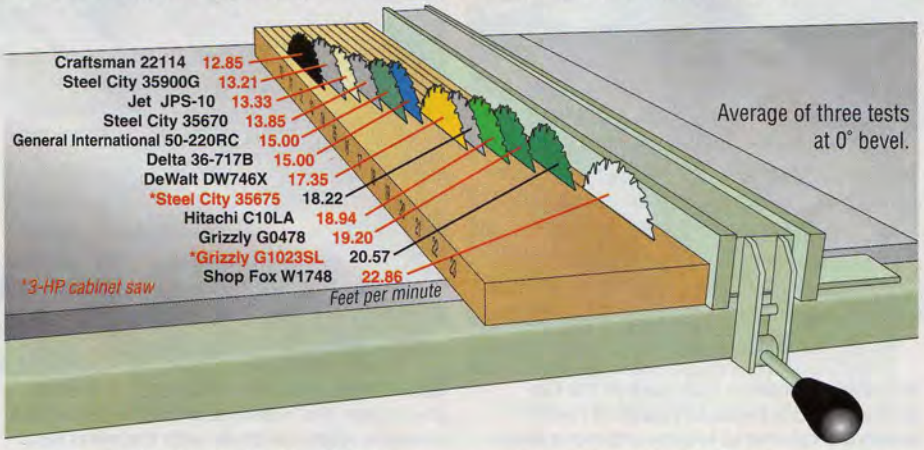
A catchy title means nothing without power

Each of the hybrids has a 110-volt induction motor, rated from 1½ to 2 hp, mounted below the blade. To test each model's true power, we outfitted them with identical full-kerf 24-tooth blades, then ripped 2"-thick red oak as fast as each saw could handle, at 0° and 45° bevels. As shown in the chart on the *next page*, the Shop Fox W1748 demonstrated the most power, as it breezed through the wood without bogging down. It even bested two 3-hp saws.

Grizzly's G0478, a near twin to the Shop Fox, finished second among

Shop Fox Dominates Power Test

We tested each saw's power and cutting speed by ripping 2"-thick red oak with identical Freud 24-tooth blades, pushing the wood as fast as each machine could handle it.



hybrids, 3½ feet per minute off the pace, with the Hitachi C10LA and DeWalt DW746X close behind. The 1⅛"-wide drive belts on the three top-performing saws (including the 3-hp Grizzly G1023SL) seem to transfer power better from the motor to the blade.

Four saws cut only about half as fast as the Shop Fox. Although these models don't have the power of the leaders, they still cut everything we threw at them when we reduced the feed rate. As with a contractor saw, these hybrids will cut faster using thin-kerf blades.

Sturdy fence, miter gauge will be your best friends

All of the saws feature T-square-style fences. We liked the Steel City 35670's Deluxe Fence best because it deflected the least (.0033") during tough rip cuts. It has UHMW sideboards, slides easily along the rail, and locks solidly in place. Jet's ProShop aluminum fence features two T-slots on top—handy for mounting accessories—and finished second in the deflection test at .004". Delta finished third (.005"), followed by Hitachi (.0053"), and DeWalt (.006").

We like the matching Aluma-Classic fences on the Grizzly and Shop Fox for their features—T-slots on each face, a scale marked in 1/32" increments over its full length, and a magnifying cursor—but they deflected 0.0077" and 0.009" (sixth and seventh, respectively) in the test. When using a properly aligned blade guard or splitter, you likely won't notice a problem with this amount of fence deflection. But when we ripped on these saws with no guard or splitter, the workpiece cutoff wandered into the back teeth of the blade slightly and resulted in a little spray of sawdust back toward us. Greater amounts of deflection could create potential kickback when you don't use the splitter.

The miter gauges are all basic units, with stops at 0° and 45°. We give a slight edge to those that use a retractable pin (Craftsman, General International, Jet, and Steel City) to contact the adjustable stops. The pins provide a more stable bearing surface than the wobbly flip-up metal tabs of the other miter gauges.

More findings that should help shape your decision

■ **Safety guards.** Like the manufacturers, we encourage you to use your blade guard and splitter. Because most prove difficult to remove and replace, you might be tempted to leave them off. Fortunately, Steel City and Craftsman saws have quick-release systems [**Photo A**], which eliminate the hassle. The General International and Steel City's granite-top 35900G have separate riving knives [**Photo B**], for use when you need to remove the guard. These riving knives mount behind the blades to maintain the kerf openings and prevent kickback, but do not shield you from the blade.

■ **Dust collection.** The enclosed bases keep most of the dust out of your shop's air, but not all the debris goes into your dust collector. The DeWalt outperformed the pack in spite of its open back and bottom, thanks to a shroud around the blade [**Photo C**]. Hitachi's hopper-shaped bottom worked well to corral dust [**Photo D**]. The others allowed much dust to build up in the corners of the cabinet.

A QUICK CHANGE OF THE GUARD

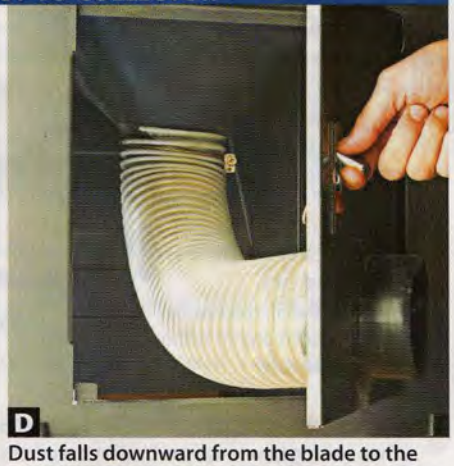
Guards on Steel City and Craftsman saws slide into a tension clip inside the throat and over a bolt on the back. No tools required.

A GOOD SAFETY SUBSTITUTE

A riving knife, like this one on the General International hybrid, keeps the blade kerf open and prevents kickback.

BUILT-IN COMPONENTS CHANNEL DUST TO COLLECTOR

DeWalt's blade shroud captures dust at the point of cut and funnels it to a 2½" port and your shop vacuum or dust collector.

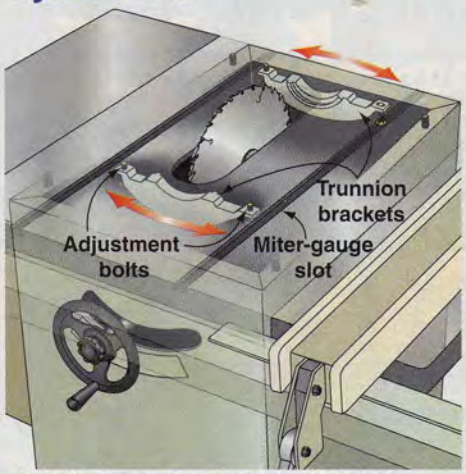


Dust falls downward from the blade to the hopper in Hitachi's cabinet, and into the 4" port in the center of the hopper.

■ **Aligning the tabletop to the blade.** Kudos to Craftsman and Steel City for their cabinet-mounted trunnions, *far right*, that make it easy to align the miter slots to the blade. The other saws' trunnions mount directly to the underside of the tabletop, *near right*. They require loosening four to six bolts inside the cabinet, while you move the trunnion to make the adjustment—not an easy task in many.

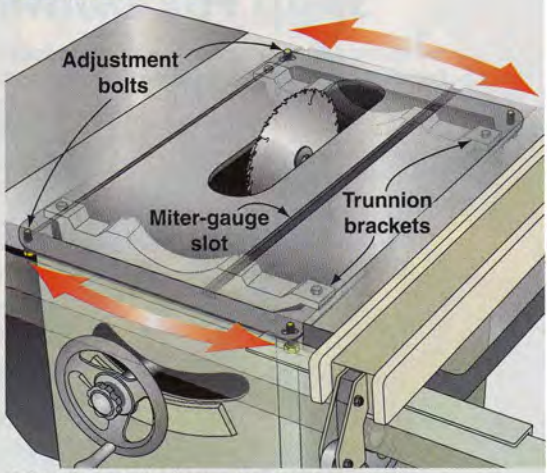
■ **Switches.** These come in two types, magnetic or mechanical. We prefer magnetic switches with large paddles over the "off" button. A magnetic switch prevents the machine from restarting if there is a power outage during a cut.

Hybrid Saw



Adjusting trunnions mounted to the top proves difficult because you must reach inside the cabinet to loosen and move them.

Cabinet Saw



Cabinet-mounted trunnions stay put while you loosen the bolts and pivot the table from above to align the blade with the miter slot.

A close-up look at the hybrids (Note: mobile bases not included)

Craftsman 22114, $750

800-383-4814, craftsman.com

High Points

- The safety guard easily mounts and dismounts with no tools.
- The power switch mounts anywhere along the fence rail.
- Setscrews make leveling table extension wings easy, a big plus when assembling the machine.
- The trunnions mount to the cabinet rather than the top, making it easy to align the top to the blade.

Low Points

- The aluminum rip fence deflected 0.027"—the most in our test—despite front and rear clamps.
- It was the slowest-cutting and loudest saw in the test.

More Points

- Centered fence rails provide a little over 25" rip capacity left of the blade (most in the test) and right of the blade (least in the test). Also, we found the rip fence microadjuster difficult to use.
- You must take the arbor washer off the arbor for dado widths greater than 11/16".

DeWalt DW746X, $1,200

800-433-9258, dewalt.com

High Points

- In spite of having the only open cabinet back, it provided the best dust collection, thanks to its blade shroud and 2½" funneled dust port.
- It exhibited above-average power, outmuscling six of its peers during heavy test cuts.
- At about 40×55", this saw has the most compact footprint without sacrificing rip capacity.

Low Points

- Its power switch is small and hard to reach, especially with a knee or thigh.
- When making bevel cuts, the blade moved from its setting unless locked.
- The rip fence proved difficult to adjust parallel to the blade, and you must move the single sideboard to the opposite face for left-of-blade rips.

Delta 36-717B, $1,100

800-223-7278, deltaportercable.com

High Points

- Its large off-switch was easy to reach and bump with a leg.
- A support leg and melamine-coated particleboard extension wing are standard equipment.
- Beefy handwheels ease blade adjustments and lock solidly.
- The bevel-scale cursor sits close to the scale for the easiest setting of angles.

- At 86 decibels, it's one of the quietest saws in the test.
- The rip fence deflected little during cuts.

Low Points

- Its triangular miter gauge was difficult to use and set accurately.
- The blade guard must be held or propped up while changing blades.

General International 50-220RC, $1,575

888-949-1161, general.ca

High Points

- One of only two tested saws with a riving knife (if you choose to remove the blade guard).
- The arbor lock makes one-wrench blade changes quick and easy.
- Its large off-switch was easy to reach and bump with a leg.

Low Points

- We could not correctly calibrate the digital bevel display with the blade.
- Despite a blade shroud and 2½" hose that connects to the 4" port, dust collection proved no better than models without a shroud.

More Points

- The rip fence was solid and held with little deflection, but at 2⅛" tall, it's the shortest fence in the test by nearly ½".
- Because the heavy-duty arbor assembly rides vertically on four columns rather than a cantilevered arm, it's more difficult to raise the blade.
- With an aluminum rip fence, the price drops to $1,470.

"If I'm willing to spend $1,000 on a hybrid...

...should I instead get a 3-hp saw for about the same money?" To find out, we tested two comparably priced 3-hp tablesaws: Grizzly's G1023SL and Steel City's 35675. Both need 220-volt power and have a few similarities (left-tilting arbor, UHMW-faced T-square-style rip fences, cabinet-mounted trunnions for easier top-to-blade alignment, and magnetic switches). The saws also displayed about equal power, with the Grizzly cutting at 20.57 fpm in 2"-thick red oak and the Steel City cutting 18.22. But both saws trailed the 2-hp Shop Fox W1748 hybrid in our testing.

The G1023SL sells for $995 equipped for 30" rip capacity. You get a miter gauge, but no saw blade or plug for the power cord. The 35675 sells for $1,200 with 30" rip capacity. With that you get a 40-tooth blade, miter gauge, and a table-wing extension. You can upgrade each machine's fence rails for 50" rip capacity.

The bottom line: These tablesaws don't quite have the oomph of pricier cabinet saws, such as a Delta Unisaw or Powermatic 66, but they're not bad. As for the choice between these or a hybrid, we say get three horses if you're wired for 220. The Steel City 35675 has the edge in capacities and standard equipment, but for $200 less we'd opt for the performance advantage from the Grizzly G1023SL. (See the bottom rows of the chart on the *next pages* for a head-to-head comparison.)

Grizzly G1023SL

Steel City 35675

Grizzly G0478, $775

800-523-4777, grizzly.com

High Points

- This saw proved the second most powerful hybrid in the test, and it runs smoothly with only slight vibration.
- It has the greatest capacity for crosscuts (13⅜") with the miter gauge resting on the top.
- We like its aluminum rip fence with T-slots on each side and a magnifying cursor.

Low Points

- This power-hungry saw requires a dedicated 20- or 30-amp circuit (depending on the gauge of wire used) for 110 volts to avoid tripping a breaker.
- Despite many attempts, we couldn't get the miter slot and blade parallel (.004" off was the best we could do; we strived for half that).
- It does not come with a plug for the power cord or a saw blade.

More Points

- It has a magnetic power switch, but the off-switch is smaller than most and hard to locate with a leg.
- Although the handwheels crank easily, it takes more than 46 revolutions to fully raise the blade—more than twice as many turns as most of the saws tested.

Jet JPS-10, $950

800-274-6848, jettools.com

High Points

- Its sturdy aluminum rip fence held securely with only slight deflection and has the best magnifying cursor on the scale.
- Its large off-switch was easy to reach and bump with a leg.
- The arbor lock makes one-wrench blade changes quick and easy.

Low Points

- It ranked among the least powerful saws in the test.
- It has the smallest capacity for crosscuts (10½") with the miter gauge resting on the tabletop.

More Points

- Although its cabinet does not extend fully to the floor, it is enclosed and provided respectable dust collection.

Hitachi C10LA, $1,000

800-829-4752, hitachipowertools.com

High Points

- Despite a 1½-hp motor, this saw outpowered beefier saws.
- The included small outfeed table proved handy and effective.
- Microadjusters on the rip fence proved accurate and easy to use.

Low Points

- Its power switch is small and hard to reach.
- You must remove the outfeed table, six hexhead bolts, and the back panel to access the motor and trunnions for adjustments.
- We could not get all the detents on the miter gauge set accurately.
- The blade guard must be held or propped up while changing blades, and the narrow throat opening makes blade changes more difficult.

More Points

- There's no lock on the blade height handwheel, although we never had problems with the blade slipping.

Shop Fox W1748, $980

800-840-8420, shopfox.biz

High Points

- Far and away, this saw proved the most powerful in the test, and it ran smoothly with only slight vibration.
- We like its aluminum rip fence with T-slots on each side and a magnifying cursor.

Low Points

- This power-hungry saw requires a dedicated 20- or 30-amp circuit (depending on the gauge of wire used) for 110 volts to avoid tripping a breaker.
- Bolt placement made adjusting the trunnions more difficult than most when aligning the top parallel to the blade.
- It does not come with a plug for the power cord or a saw blade.

More Points

- It has a magnetic power switch, but the off-switch is smaller than most and hard to locate with a leg.
- Although the handwheels turn easily, it takes more than 43 revolutions to fully raise the blade.

Steel City 35900G, $1,250

877-724-8665, steelcitytoolworks.com

High Points

- This model has a 2"-thick, perfectly flat and smooth solid-granite top that delivered best-in-test vibration dampening.
- The safety guard easily mounts and dismounts with no tools.
- You have two riving knives (tall/full kerf and short/thin kerf) to choose from when not using the blade guard.
- Its large off-switch was easy to reach and bump with a leg.
- The trunnions mount to the cabinet rather than the tabletop, making it easy to align the top to the blade.
- At 84 decibels, it's the quietest saw in the test.

Low Points

- It ranked among the least powerful saws.

More Points

- The industrial rip fence locked solidly and slid smoothly, but exhibited the second most deflection (0.0097") in the test.
- You must leave the arbor washer off the arbor for dado widths greater than 11/16".

Steel City 35670, $1,100

877-724-8665, steelcitytoolworks.com

High Points

- We rate this model's rip fence best-in-class because it showed almost no deflection, locks solidly, glides easily on the rail, and has a scale marked in inches and centimeters.
- The safety guard easily mounts and dismounts with no tools.
- Built-in setscrews make it easy to level the cast-iron wings to the table during assembly.
- It had the only cast-iron table that was perfectly flat and did not need shimming.
- Its large off-switch was easy to reach and bump with a leg.
- The trunnions mount to the cabinet, making it easy to align the top to the blade.

110-VOLT HYBRID TABLESAW SHOWDOWN

BRAND / HYBRID TABLESAWS	MODEL	MOTOR: RATED HORSEPOWER	MOTOR: VOLTAGE	MOTOR: TYPE OF DRIVE BELT (1)	DIMENSIONS, INCHES: OVERALL, H×D×W WITH RIP FENCE AND BLADE GUARD	DIMENSIONS, INCHES: TABLETOP, D×W	DIMENSIONS, INCHES: FRONT OF TABLE TO BLADE	CAPACITIES, INCHES: MAX. RIP, LEFT OF BLADE	CAPACITIES, INCHES: MAX. RIP, RIGHT OF BLADE	CAPACITIES, INCHES: MAX. CUTTING HEIGHT AT 90°	CAPACITIES, INCHES: MAX. CUTTING HEIGHT AT 45°	CAPACITIES, INCHES: MAX. DADO BLADE WIDTH (2)
CRAFTSMAN	22114	1½	110/220	F	39¾ × 42½ × 66⅜	27 × 40⅛	12⁹⁄₁₆	25⁹⁄₁₆	25⅝	3⅝	2⅜	11⁄16
DELTA	36-717B	1¾	110/220	F	38⅞ × 46 × 64⅛	27 × 54⁹⁄₁₆	13	14½	29⅝	3⅛	2¼	13⁄16
DEWALT	DW746X	1¾	110/220	R	39¾ × 37¾ × 55³⁄₁₆	27 × 40³⁄₁₆	12⅛	13¹⁵⁄₁₆	28	3	2³⁄₁₆	13⁄16
GENERAL INTERNATIONAL	50-220RC	1½	110/220	F	39¹⁵⁄₁₆ × 40⅞ × 60¹⁄₁₆	27 × 44	11⁵⁄₁₆	14⁵⁄₁₆	28⁹⁄₁₆	3	2⁵⁄₃₂	13⁄16
GRIZZLY	G0478	2	110/220	F	39³⁄₁₆ × 47⅛ × 60	27 × 39⅝	13⅜	7⁷⁄₁₆	29¾	3¼	2³⁄₁₆	13⁄16
HITACHI	C10LA	1½	110/220	V	42⅛ × 38⅛ × 65¹⁵⁄₁₆	27⅛ × 40¼	12⁵⁄₁₆	18⅜	30⁷⁄₁₆	3⁵⁄₁₆	2¼	13⁄16
JET	JPS-10	1¾	110/220	R	40⁵⁄₁₆ × 37¾ × 59⅝	27 × 44	10⁹⁄₁₆	10⁹⁄₁₆	31⅞	3⅜	2⅜	13⁄16
SHOP FOX	W1748	2	110/220	F	39⅜ × 47⅛ × 60	27 × 39⅝	13⁵⁄₁₆	7⅝	29⁹⁄₁₆	3⅛	2³⁄₁₆	13⁄16
STEEL CITY	35670	1¾	110/220	F	39⅝ × 45¼ × 62¼	27 × 56⅛	12⅝	12⅞	29⅝	3⁵⁄₁₆	2⁷⁄₁₆	11⁄16
	35900G	1¾	110/220	F	41½ × 42¾ × 64⁵⁄₁₆	27 × 56⅛	11¹³⁄₁₆	14	30¼	3⅜	2⅜	11⁄16
3-HP CABINET TABLESAWS												
GRIZZLY	G1023SL	3	220	3V	38¼ × 46⅛ × 55¹³⁄₁₆	27 × 40¹⁄₁₆	12⅜	8¹⁄₁₆	25¹³⁄₁₆	2³¹⁄₃₂	2⅛	15⁄16
STEEL CITY	35675	3	220	F	39½ × 42¾ × 64³⁄₁₆	27 × 56⅛	12½	13⁹⁄₁₆	30⁹⁄₁₆	3³⁄₁₆	2⁵⁄₁₆	11⁄16

1. (F) Flat multi-ribbed
   (R) Ribbed V-belt
   (V) Standard V-belt
   (3V) 3 V-belts
2. Measured with arbor washer on and nut tightened fully onto arbor threads.
3. (A) Aluminum
   (M) Melamine
   (U) UHMW
4. (MA) Magnetic
   (ME) Mechanical
5. (1) Single wrench
   (1L) Single wrench with arbor lock
   (2) Two wrenches
6. A Excellent
   B Good
   C Fair
   NA Blade not included

Low Points

- It ranked among the least powerful saws in the test.
- The blade flutters a little side to side as it coasts down, opening the zero-clearance kerf slightly.

More Points

- You must leave the arbor washer off the arbor for dado widths greater than 11/16".

Put your money toward the power

None of these saws has a flaw so significant that we'd warn you to steer clear of it, but many turned out to be little more than closed-base contractor saws. So we put greater emphasis on power, and that's why the Shop Fox W1748 gets the nod as Top Tool. It not only outpowered the other hybrids, it also humbled two 3-hp saws. The W1748 vibrated a barely noticeable amount, and has a durable aluminum T-square fence, accurate bevel stops, and large, easy-turning handwheels with solid locks.

Written by **Bob Hunter** with **Craig Ruegsegger**
Illustrations: **Tim Cahill**

HANDWHEELS					PERFORMANCE RATINGS (6)																	ACCESSORIES (10)							
					PRIMARY								SECONDARY																
REVOLUTIONS REQUIRED TO RAISE BLADE TO FULL HEIGHT	REVOLUTIONS REQUIRED TO TILT BLADE TO 45°	RIP FENCE SIDEBOARD MATERIAL (3)	TYPE OF ON/OFF SWITCH (4)	BLADE CHANGE METHOD (5)	POWER (7)	OVERALL QUALITY OF RIP FENCE	ABSENCE OF FENCE DEFLECTION (8)	ABSENCE OF VIBRATION	EASE OF ALIGNING TABLE AND BLADE	EASE OF ADJUSTING FENCE TO BLADE	EFFECTIVENESS OF SAFETY GUARDS	EASE OF REACHING ON/OFF SWITCH	QUALITY OF MITER GAUGE	EASE OF CHANGING BLADES	EASE OF ADJUSTING BEVEL STOPS	ACCURACY OF BEVEL SCALE	ACCURACY OF RIP FENCE SCALE	DUST COLLECTION (9)	EASE OF ADJUSTING WINGS TO TOP	EASE OF REMOVING BLADE GUARD	EASE OF USING HANDWHEELS	QUALITY OF INCLUDED BLADE	STANDARD	OPTIONAL	NOISE LEVEL, DECIBELS	WEIGHT, LBS	CORD LENGTH, FEET	WARRANTY, YEARS (11)	COUNTRY OF ASSEMBLY (12)	SELLING PRICE (13)
18½	31	A	ME	2	B	B-	C-	B	A	B	B-	A	b+	a	a	b	a	b-	a	a	a	b	B,F,M		95	315	8	1	C	$750
18	31½	M	ME	2	B+	B+	A-	B	B	B	B-	A	c	b+	a	b	a	b+	a	b	a	b	B,E,F,M	R	86	315	8	2	C	$1,100
21½	22½	A	ME	2	A-	B+	A-	B	B	B	B-	C+	b-	b	a	c	a	a-	a	c	b-	b	B,F,M	R	94	276	8	3	C	$1,200
19	42	M	ME	1L	B+	A-	B	B	B	B	B	A	b	a	a	b-	a	b-	b	b+	b	b	B,F,M	R	87	330	10	2	T	$1,575*
46½	50½	A	MA	1	A-	A-	B+	A-	B-	A	B-	B-	b-	b	a	b+	a	b	b	c	a	na	F,M	R	89	316	10	1	C	$775
23	16	A	ME	1L	A-	A-	A-	A-	B	B	B-	C+	b	b	c	a-	a	a-	b	b+	b	b	B(2),F,M		92	275	6¾	2	C	$1,000
34½	38	A	ME	1L	B	A	A	A-	B	A	B-	B-	b	a	a	b+	a	b+	b	b+	b	na	F,M	R	92	297	6	5	C	$950
43½	49½	A	MA	1	A	A-	B	A-	B-	A	B-	B-	b-	b	a	b+	a	b	b	c	a	na	F,M	R	89	319	10	2	T	$980
18½	31	U	ME	2	B	A	A	B-	A	B	B-	B+	b+	a	a	b-	a	b	a	a	b+	b	B,E,F,M	R	86	355	8	5	C	$1,100
19	62	U	ME	2	B	B+	B	A	A	A	B	B+	b+	a	a	b-	a	b	a	a	b+	b	B,E,F,M	R	84	470	8	5*	C	$1,250
13	29½	U	MA	2	A	A-	A	A-	A	B	B-	B	b-	a	a	a	a	b	b+	b	b-	na	F,M	R	94	410	12	1	C	$995
18½	32	U	MA	2	A-	B+	B	B	A	A	B-	B+	b+	a	a	b-	a	b	a	a	b+	b	B,E,F,M	R	88	347	8	5	C	$1,200

7. Timed cuts ripping 2"-thick red oak, average of three tests.

8. A=.006" or less
B=.0061" to .0150"
C=.0151" to .0300"

9. Using a 1½-hp dust collector.

10. (B) 10" Blade
(E) Table extension
(F) Rip fence
(M) Miter gauge
(R) 50"-rip-capacity fence rails

11. * 10-year warranty on granite top

12. (C) China
(T) Taiwan

13. Prices current at time of article production and do not include shipping, where applicable.
* Available for $1,470 with aluminum rip fence system

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Bow-Front Display Case

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With its adjustable framed-glass shelves and open sides, this easy-to-build display case will let your collectibles shine. But you won't have to collect a shopful of tools to build it, just the ones shown on the *next page*.

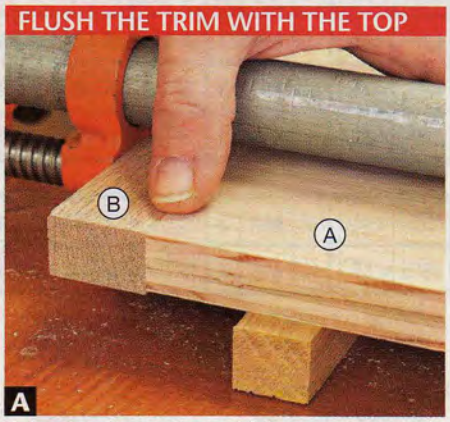
Build the top and bottom

1 Cut the top/bottom panels (A) to size [**Materials List**, *page 61*]. Then cut the end trim (B, C) to size. Cut the front trim (D, E) ¼" wider than listed.

2 Glue and clamp the narrow end trim (B) to the ends of the bottom panel (A) [**Drawing 1**] with the tops flush with the best surface of the plywood [**Photo A**]. ***Note:*** The plywood and ¾" hardwood will not be the same thickness, but that's okay. After the glue dries, glue and clamp one piece of narrow front trim (D) to the front edge of the bottom panel.

3 Glue the wide end trim (C) flush with the best surface of the top panel (A). Glue and clamp one piece of wide front trim (E) to the front edge of the top panel.

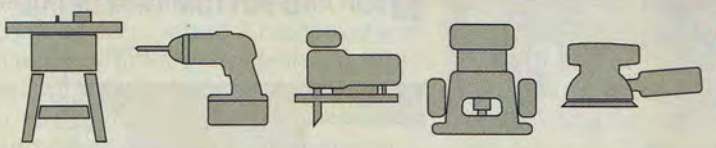
4 Clamp the bottom panel assembly (A/B/D) to your bench. Mark the curve centerline and ends on the narrow front trim (D) [**Drawing 2**]. Use a fairing stick to trace the curve. (See **Shop Tip** on



Raise the plywood panel (A) on a scrapwood spacer, and glue the narrow end trim (B) flush with the top of the bottom panel. The difference in thickness will be hidden later.

Overall dimensions:
30" wide × 14½" deep × 50½" high.

WHAT YOU'LL NEED



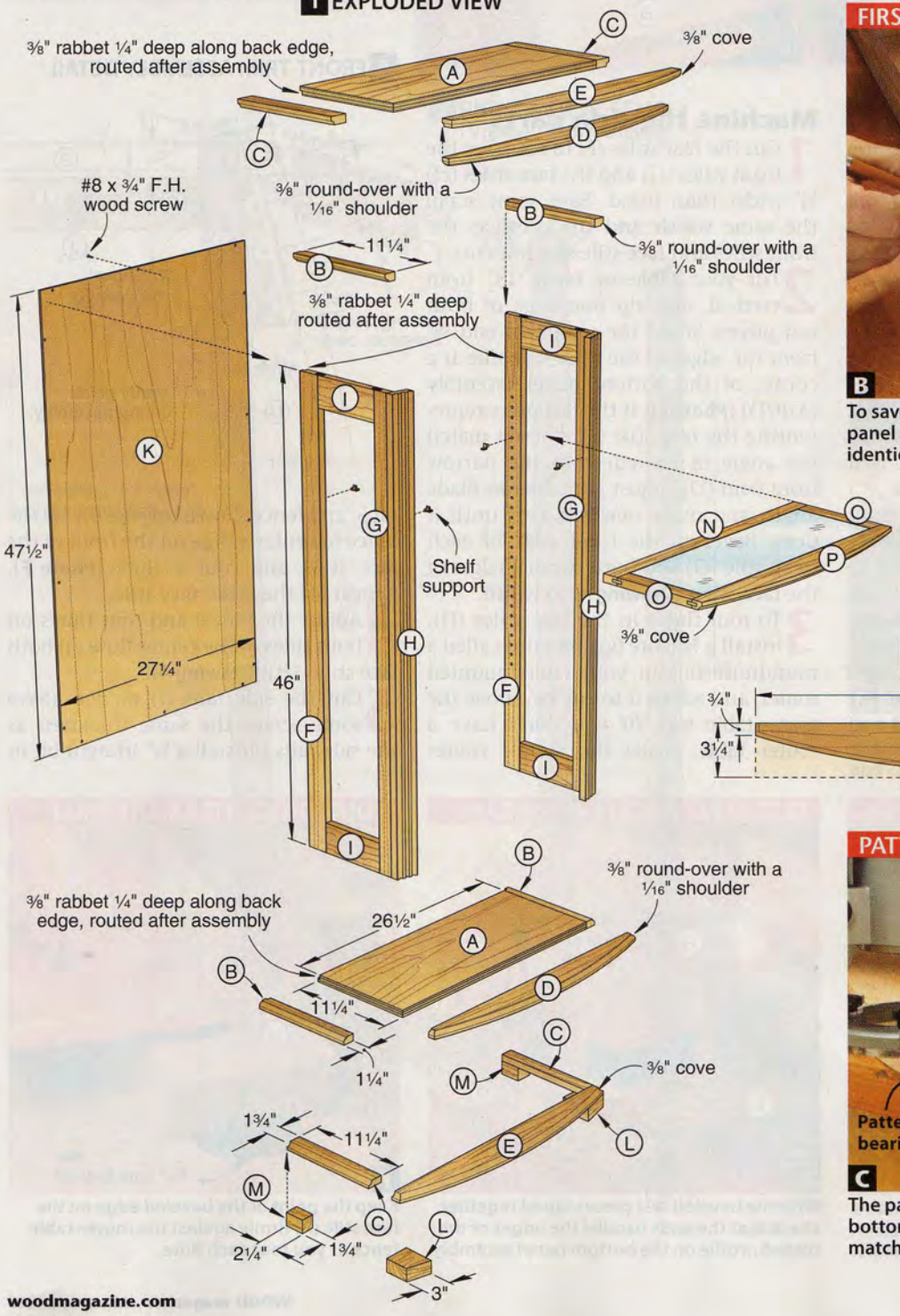
- **Materials:** ¾" red oak boards, and ¼" and ¾" red oak-veneer plywood.
- **Blade and bits:** Dado set, ⅜" round-over bit, ¼" straight bit, ⅜" cove bit, rabbeting bit, ⅜" core box bit.

page 58.) Jigsaw the curve on the waste side and sand to the line.

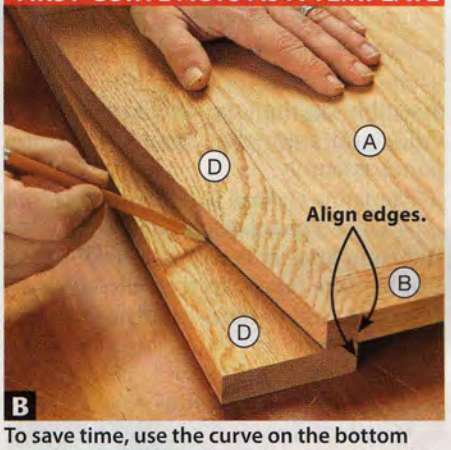
5 Double-face-tape the unmounted narrow front trim (D) to the bottom of the bottom panel assembly [**Photo B**], and trace the curve. Remove the front trim, jigsaw 1/16" from the line on the waste side, and retape the trim to the assembly. With a bottom-bearing pattern bit, rout the trim flush [**Photo C**].

6 Rip two ¼"-wide spacer strips from ¾" MDF about 36" long. Bend and tape both tight against the curved edge of the bottom panel assembly (A/B/D) [**Photo D**]. Center the bottom panel

1 EXPLODED VIEW

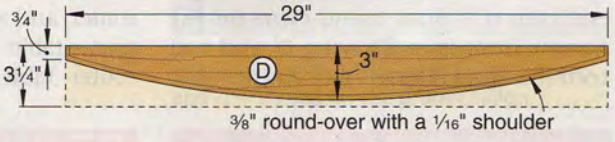


FIRST CURVE ACTS AS A TEMPLATE

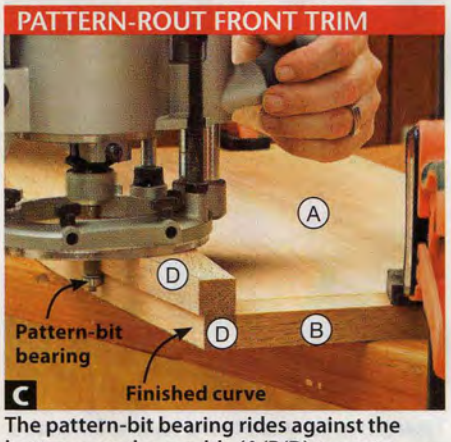


To save time, use the curve on the bottom panel assembly (A/B/D) to trace and rout the identical curve on the narrow front trim (D).

2 NARROW FRONT TRIM



PATTERN-ROUT FRONT TRIM



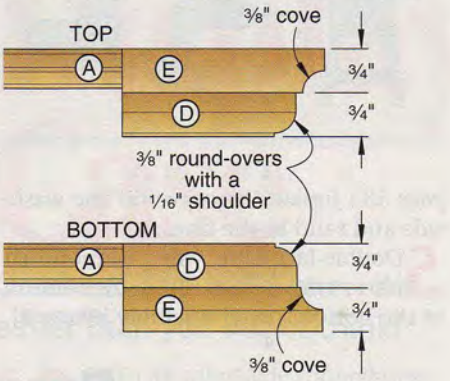
The pattern-bit bearing rides against the bottom panel assembly (A/B/D) to rout a matching curve on the narrow front trim (D).

SHOP TIP

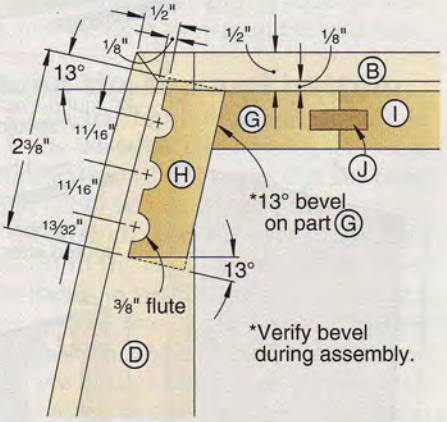
Trace smooth curves using a fairing stick

To draw a consistent curve on the narrow front trim (D), use a fairing stick made from medium-density fiberboard. (MDF bends evenly and easily because it has no grain.) First rip a ⅜"-wide strip of ¾" MDF about 36" long. Place clamps on the narrow front trim so the inside edge of the fairing stick aligns with the end marks. At the centerline, pull the fairing stick to the center layout mark, and hold it in place. Then trace a curve along the inside edge.

3 TOP AND BOTTOM TRIM DETAIL



4 FRONT TRIM ASSEMBLY DETAIL



assembly on the top panel assembly (A/C/E), and trace the curve on the top panel assembly.

7 Separate the top (A/C/E) and bottom (A/B/D) panel assemblies, and jigsaw the top-panel curve on the waste side. Double-face tape it to the bottom panel assembly, and pattern-rout the curve on the top panel assembly flush with the spacer strips. Then remove the strips.

8 Double-face-tape the loose wide front trim piece (E) to the wide front trim piece of the top panel assembly (A/C/E). Trace the curve, jigsaw it, and rout the curve flush as you did in **Step 5**.

9 Double-face-tape the narrow front trim (D) to the top panel assembly (A/C/E) and the wide front trim (E) to the bottom panel assembly (A/B/D) as they'll look on the finished case [**Drawing 1**]. Rout cove profiles on the wide front trim, including the unmounted end trim (C). Rout round-overs on the narrow front trim [**Drawing 3**] and end trim (B). Sand all parts to 220 grit.

Machine the side parts

1 Cut the rear stiles (F) to size. Cut the front stiles (G) and the face stiles (H) ¼" wider than listed. Save some scrap the same width and thickness as the front stiles and face stiles for test cuts.

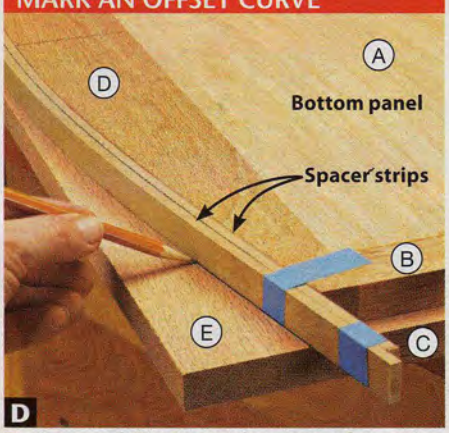
2 Tilt your tablesaw blade 13° from vertical, and rip one edge of both test pieces. Stand the scraps on end ⅛" from the edges of the routed profile at a corner of the bottom panel assembly (A/B/D) [**Photo E**]. If the test piece representing the face stile (H) doesn't match the angle of the curve in the narrow front trim (D), adjust the tablesaw blade angle, and make new test cuts until it does. Bevel-rip the front edge of each front stile (G) and both parallel edges of the face stiles [**Drawing 4**] to width.

3 To rout flutes in the face stiles (H), install a ⅜" core box bit (also called a roundnose bit) in your table-mounted router, and adjust it to cut 3/16" above the router-table top. (If you don't have a router table, make the simple router table and fence shown on *page 6*.) Set the fence to center a flute on the front of the face stile, and rout a flute [**Photo F**]. Repeat for the other face stile.

4 Adjust the fence, and rout flutes on both sides of the center flute on both face stiles (H) [**Drawing 4**].

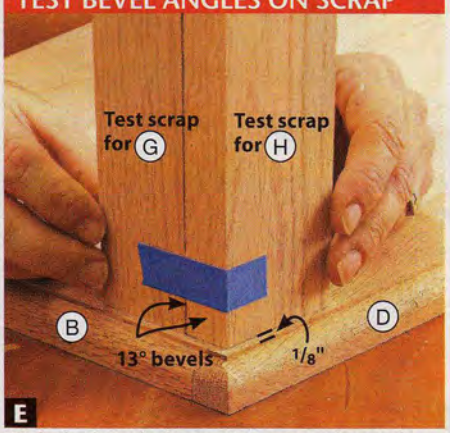
5 Cut the side rails (I) to size. (Save some scraps the same thickness as the side rails.) Install a ¼" straight bit in

MARK AN OFFSET CURVE



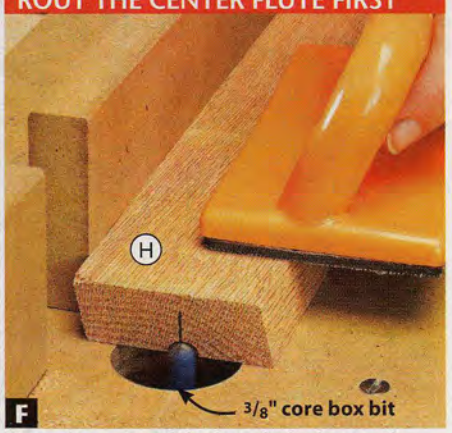
Taping two ¼" strips to the narrow front trim (D) makes it easy to trace, cut, and pattern-rout mating curves on the wide front trim (E).

TEST BEVEL ANGLES ON SCRAP



With the beveled test pieces taped together, check that the ends parallel the edges of the routed profile on the bottom panel assembly.

ROUT THE CENTER FLUTE FIRST



Keep the point of the beveled edge on the face stile (H) firmly against the router-table fence as you rout each flute.

your table-mounted router, and adjust it to cut ⅜" deep. Attach a hardboard auxiliary fence to the router-table fence for a smooth surface, and use side-rail scraps to test and adjust the fence position until the groove is centered on the thickness of the scraps [**Photo G**].

6 Attach a stop to the router-table auxiliary fence 2½" from the bit center. Using a pushpad, rout a groove at both ends of each side rail (I) [**Photo H**] and on the inside edges of the rear stiles (F) and front side stiles (G) [**Drawing 5**]. Leave your router table set up this way, without the stopblocks, for the shelves.

7 Cut the shelf back rails (N) to size. Then cut 3½"-wide blanks to length for each pair of shelf sides (O), and cut the shelf front rails (P) ¼" oversize in width. Using the router-table setup from **Step 6**, rout ⅜"-deep centered grooves on the inside edges of the shelf back rails and front rails [**Drawing 7**].

8 Use a pushpad and backer block to rout grooves in the ends and then the edges of the shelf side blanks (O). With the grooved edges against the fence, rip the blanks to width [**Drawing 7**]. Then set them aside.

9 Lay out and drill shelf-pin holes in the rear and front stiles (F, G) [**Drawing 5**]. We used a handheld drill with the bit taped ⅜" from the tip as a depth stop. (Watch a free video on drilling shelf-pin holes at woodmagazine.com/videos.)

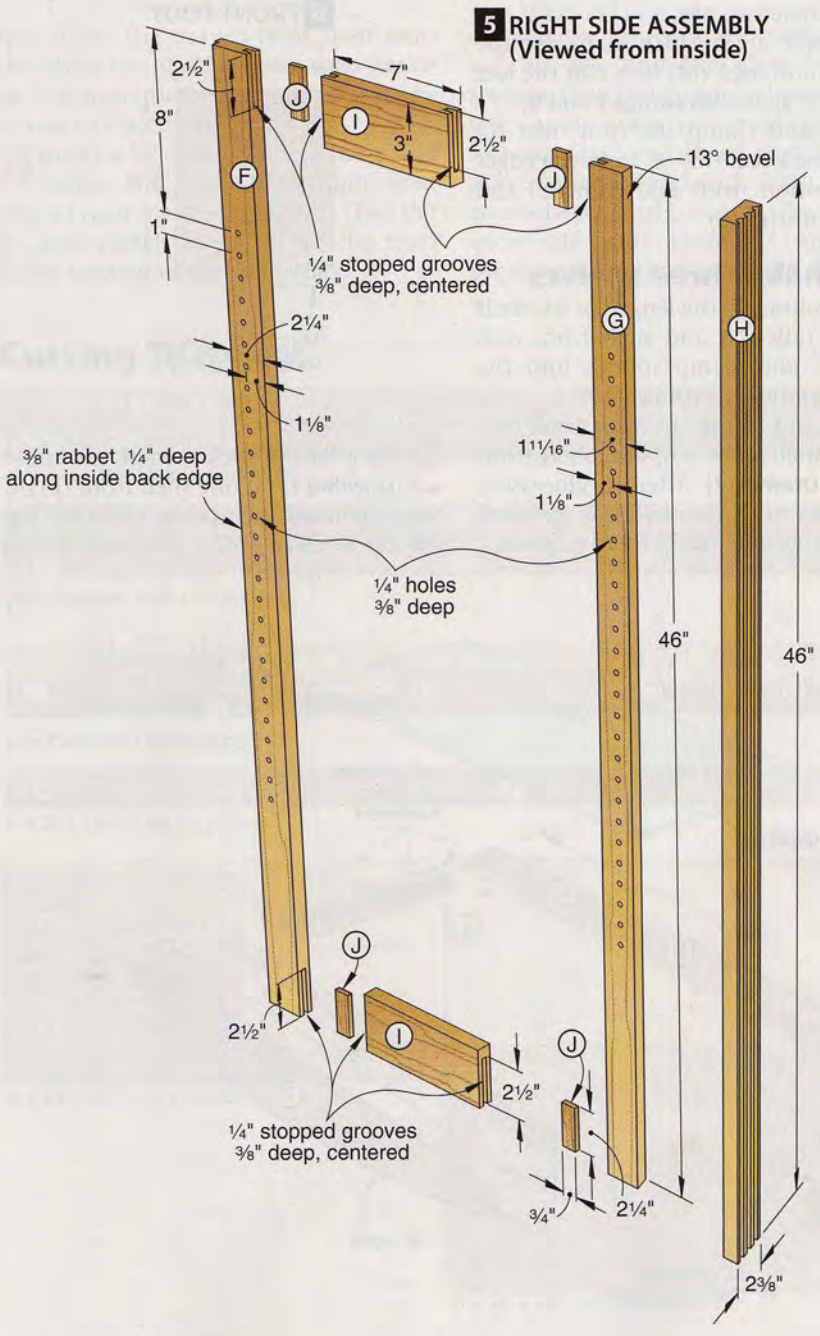
Assemble the sides

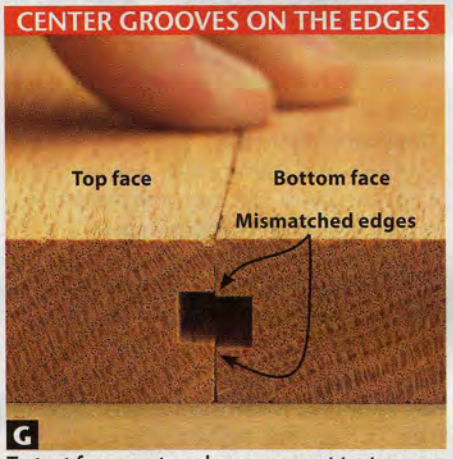
1 Make three ¾×2½×4" scrapwood alignment blocks, and cover one face of each with clear packing tape. Double-face-tape the covered face of the blocks to the outside face of a front stile (G) near the ends and middle to keep the glue-up from slipping as it's clamped. Then glue and clamp a face stile (H) to a front side stile [**Photo I**]. Repeat for the other front stile and face stile.

2 Rip spline blanks (J) ¼" wide from ¾" hardwood. From one blank, cut eight splines 2½" long. Set aside the remaining blanks.

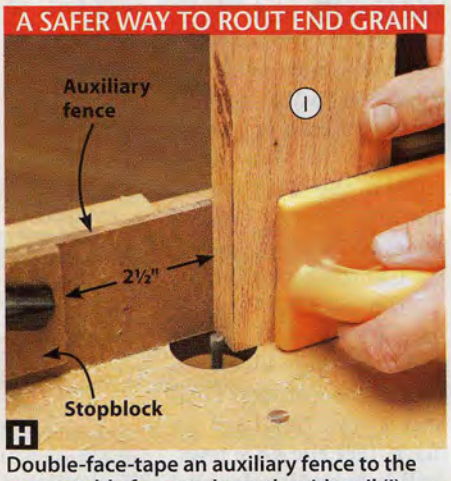
3 Glue and insert splines (J) into the ends of the side rails (I). Then glue

5 RIGHT SIDE ASSEMBLY (Viewed from inside)

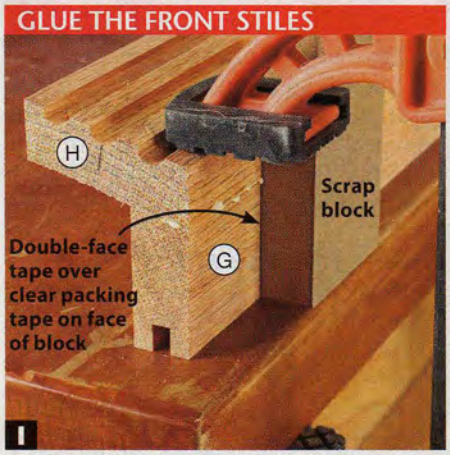




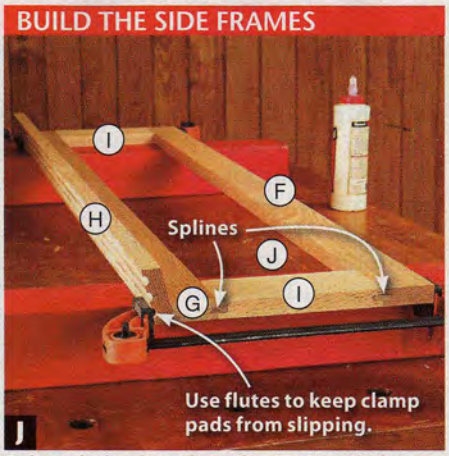
To test for a centered groove, rout test passes in two scraps. Turn one scrap upside down, and check whether the grooves align.



Double-face-tape an auxiliary fence to the router-table fence to keep the side rail (I) ends from catching as you rout.



Alignment blocks taped to the front stile (G) keep it from sliding out of position. Packing tape on the block keeps glue from sticking.



Splines help align the stiles (F, G) with the rails (I) during assembly. Use clamps with padded faces to avoid marring the surfaces.

Clamp the side assemblies to the bottom panel assembly (A/B/D) on a flat surface to avoid twisting the case.

and clamp the side rails between the rear stile (F) and front face stile (G/H) [**Photo J**]. Repeat for the other side.

Complete the case

1 Glue and clamp a narrow end trim piece (B) with its inside edge flush with the inside face and the back of a side assembly (F/G/H/I) [**Drawing 1**]. Repeat for the other side assembly.

2 Glue and clamp the side assemblies to the bottom panel assembly, leaving a ⅛" reveal from the routed profile [**Drawing 4**, **Photo K**].

3 Glue and clamp the narrow front trim (D) to the side assemblies and narrow end trim (B) [**Drawing 1**].

4 Glue and clamp the top panel assembly to the narrow end trim (B) and narrow front trim (D) [**Photo L**]. Then glue and clamp the wide end trim (C) and the wide front trim (E) to the bottom panel assembly, with the end trim inside edges flush with the narrow end trim (B) edge.

5 Mount an auxiliary router base, as shown in the **Shop Tip**, *opposite top*, and rout a ⅜" rabbet ¼" deep in the inside edges of the rear stiles (F) and the top and bottom panel assemblies.

6 Cut the back (K) to fit the rabbeted opening. Then use a jigsaw and sanding block to round the corners. Drill and screw the back in place. (For the #8 screws, drill 5/32" shank holes and 7/64" pilot holes.)

7 Laminate two pieces of ¾×4×12" oak to make a 1½"-thick blank for the front (L) and back (M) feet. Cut the feet to size and shape [**Drawings 1** and **6**].

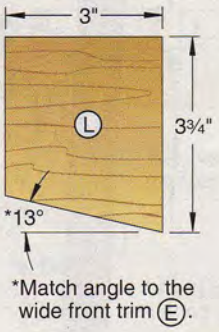
8 Glue and clamp the front feet (L) and back feet (M) ⅛" from the edges of the bottom wide end trim (C) and wide front trim (E).

Now make three shelves

1 Cut splines (J) the length of the shelf back rails (N) and shelf front rails (P). Glue and clamp splines into the grooves in the rails [**Drawing 7**].

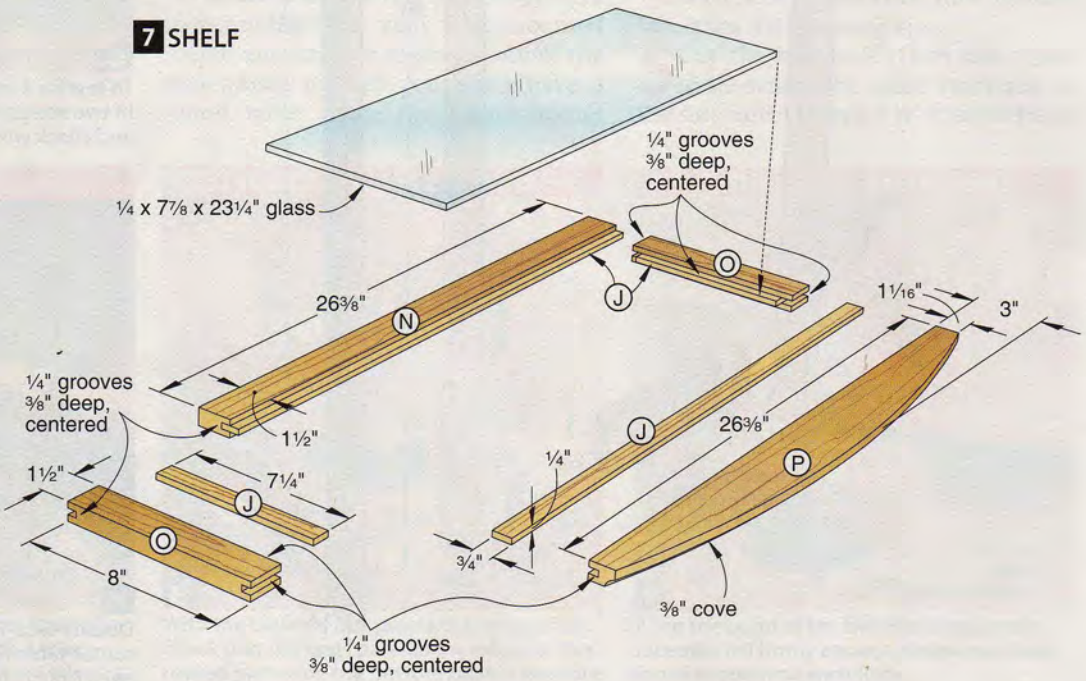
2 Glue and clamp the shelf back rails (N), shelf sides (O), and shelf front rails (P) [**Drawing 7**]. After the glue dries, cut splines to fit the shelf-side grooves. Center, glue, and clamp them in place.

6 FRONT FOOT



3 Use a fairing stick to mark the curve [**Drawing 7**] on one shelf front (P) on the assembled shelf frame (N/O/P). Jigsaw on the waste side, and sand to the

7 SHELF



ADD THE TOP PANEL ASSEMBLY

Glue and clamp the top panel assembly centered between the narrow end trim (B) on the side assemblies.

SHOP TIP

No tipping allowed

Rabbeting a ¾"-wide edge can leave bumps and gouges if the router wobbles. Stabilize it with a ¾×6×48" auxiliary base that rests on opposite edges of the case. Drill a centered 1½"-diameter bit hole in from one end a distance half the width of your router base. Use the same method as for mounting a router in the shop-built table on *page 6* to mount it on the auxiliary base. Now your router will feel like it's supported on a tabletop, not a tightrope.

line. Trace the curved-front shelf onto the other two shelf frames, then jigsaw on the waste side, and pattern-rout the curves to match the first shelf.

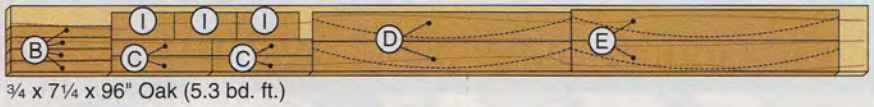
4 Insert a ⅜" cove bit into a handheld router, and rout the bottom front edge of each shelf front rail (P). Then cut ¼" glass panels to fit within the shelf frame resting on the splines (J).

5 Remove the back and shelves from the case and the glass from the shelves, then finish-sand all parts to 220 grit. Apply stain (we used Varathane Mission Oak) and three coats of satin polyurethane. Sand with 320-grit abrasive between coats. Now you're ready to show off your keepsakes and your improved woodworking skills.

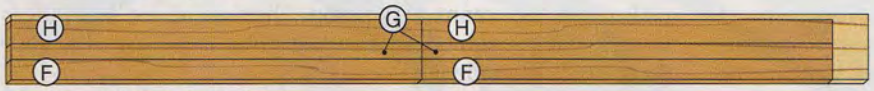
Written by **Bob Wilson** with **Jeff Mertz**
Project design: **Jeff Mertz**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Basic-Built projects require only a limited number of inexpensive and readily available tools and materials. For more information, go to woodmagazine.com/basicbuilt

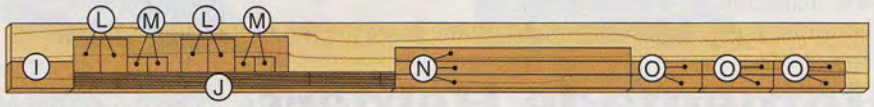
Cutting Diagram



¾ x 7¼ x 96" Oak (5.3 bd. ft.)

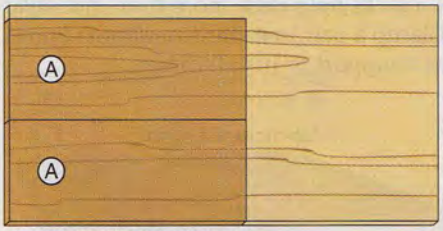


¾ x 7¼ x 96" Oak (5.3 bd. ft.)

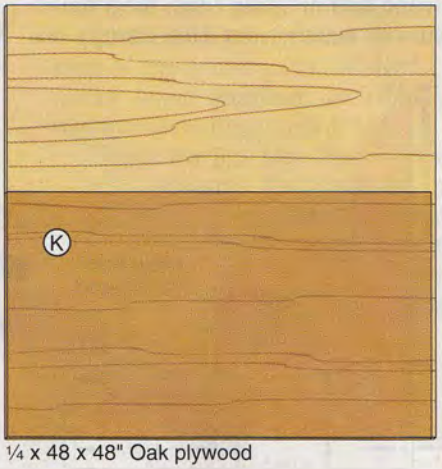


¾ x 7¼ x 96" Oak (5.3 bd. ft.)

¾ x 3½ x 96" Oak (2.7 bd. ft.)



¾ x 24 x 48" Oak plywood



¼ x 48 x 48" Oak plywood

Materials List

		FINISHED SIZE T	W	L	Matl.	Qty.
Carcase						
A	top/bottom panels	¾"	11¼"	26½"	OP	2
B	narrow end trim	¾"	1¼"	11¼"	O	4
C	wide end trim	¾"	1¾"	11¼"	O	4
D*	narrow front trim	¾"	3"	29"	O	2
E*	wide front trim	¾"	3⅜"	30"	O	2
F	rear stiles	¾"	2¼"	46"	O	2
G*	front stiles	¾"	1 11/16"	46"	O	2
H*	face stiles	¾"	2⅜"	46"	O	2
I	side rails	¾"	3"	7"	O	4
J	spline blanks	¼"	¾"	36"	O	7
K*	back	¼"	27¼"	47½"	OP	1
L*	front feet	1½"	3¾"	3"	LO	2
M*	back feet	1½"	1¾"	2¼"	LO	2
Shelves (3)						
N	shelf back rails	¾"	1½"	26⅜"	O	3
O*	shelf sides	¾"	1½"	8"	O	6
P*	shelf front rails	¾"	3"	26⅜"	O	3

*Parts initially cut oversize. See the instructions.

Materials key: OP–oak-veneer plywood , O–oak, LO–laminated oak.
Supplies: ¼×7⅞×23¼" glass (3), shelf supports (12), #8×¾" flathead wood screws.

22 All-time Top Shop Tips

Some of our most helpful advice comes from you, our readers.

If football is a game of inches, woodworking is a game of fractions where you measure success in sixty-fourths of an inch. And any technique or jig that increases accuracy or efficiency brings you one step closer to success.

From the thousands of Shop Tips that *WOOD®* magazine has published during the past 24 years, our editorial staff picked out the cream of the crop. Then we added fresh ideas to make them even better ways to:

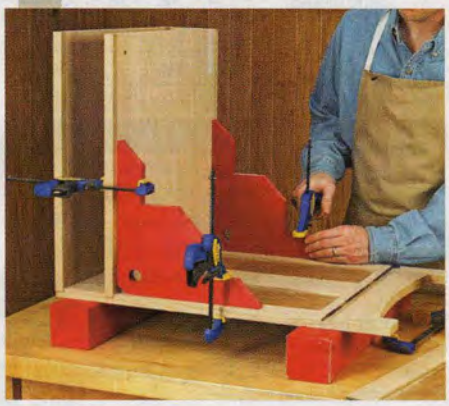
- create shop-made jigs
- ease cabinet construction
- avoid goofs
- work around problems or the limitations of your tools.

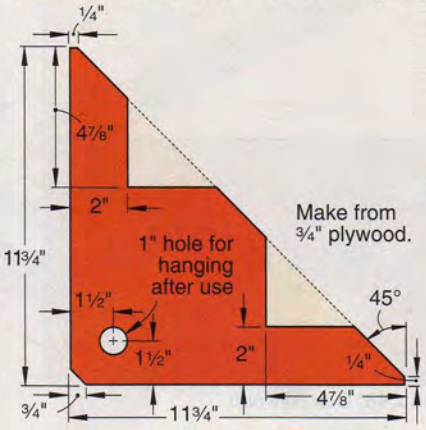
Handy Homemade Helpers

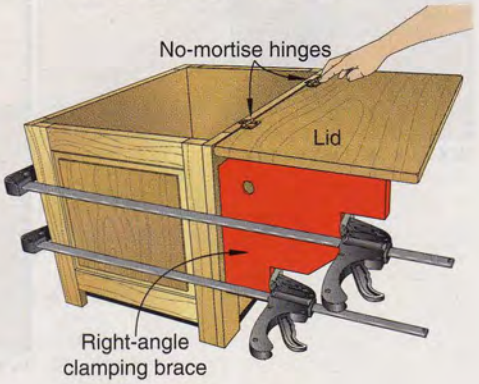
Keep right angles right

You'll never again guess the squareness of an assembly if you use these right-angle clamping blocks. They ensure a 90° alignment, as shown *below left*. Start by cutting 12" squares of ¾" Baltic birch plywood and dividing them diagonally. Then cut notches for the clamps, as shown *below center*. You can vary the sizes to suit larger or smaller projects.

Blocks help with more than glue-ups. Clamp a pair to a chest, as shown *below*, as a support to install hinges.





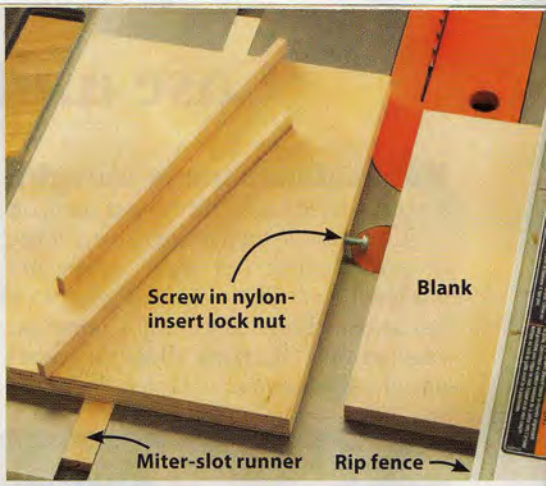


Rip thin strips reliably

Safely ripping uniformly thin strips on a tablesaw involves making a cut, resetting the fence, and making the next cut. This jig eliminates the hard part: moving the fence precisely the same distance after each cut.

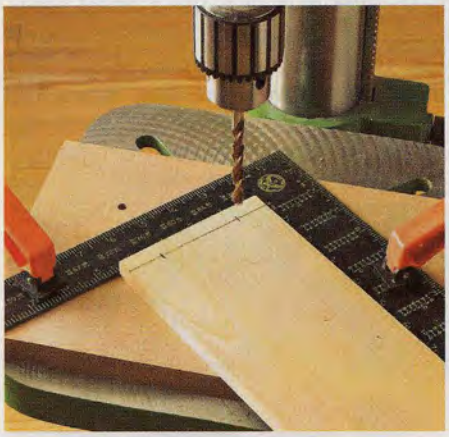
Build the jig from ¾" plywood with a hardwood miter-slot runner attached to its bottom, as shown *right*. Drill a 7/16" hole 2" deep centered along one edge of the plywood, and epoxy a ¼" nylon-insert lock nut inside the hole. After the epoxy cures, thread a 2"-long ¼"-20 roundhead machine screw.

Place the jig in your tablesaw's miter slot and turn the machine screw until the distance between the screwhead and the saw blade equals the width of the strips you want. Sandwich a blank between the rip fence and the screwhead, lock the fence, remove the jig, and rip the strip. Then return the jig to the miter slot and repeat until your blank gets too narrow to cut safely using push-sticks, usually about ¾".



Square makes a quick and easy stop

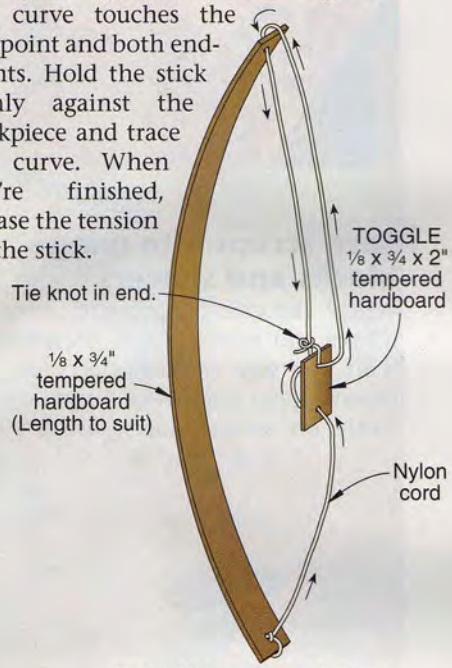
To consistently position a hole in multiple workpieces, clamp a framing square to your drill-press table. The two legs of the square act as both a fence and stop. Squares don't come with dust-relief grooves, though, so blow away chips and dust after each hole to prevent debris from becoming trapped between your workpiece and the square.



Conquer curves with a fairing stick

An adjustable string tensions this bow-like tool to create smooth arcs with ease. Unlike the super-simple fairing stick on *page 60*, this one doesn't need to be clamped in place to hold its arc.

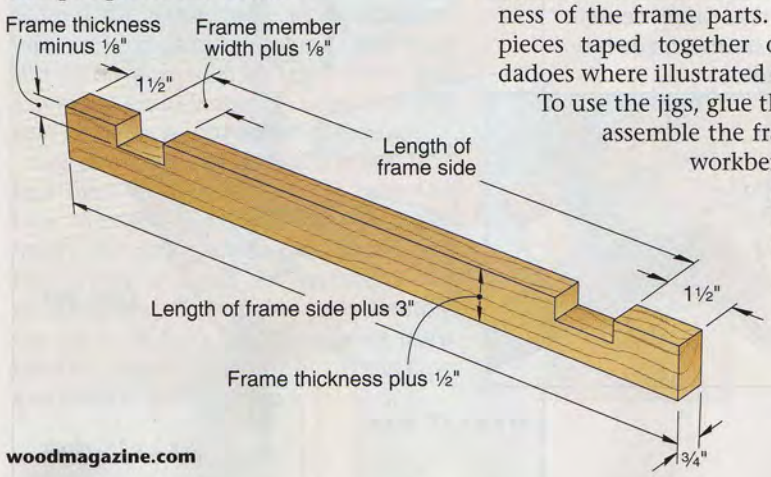
To make one, cut a ¾"-wide piece of ⅛" tempered hardboard and assemble it as shown *right*. The ones in our shop range from 2' to 3' long. For fairing sticks longer than 3', make the width about 1½". To use the fairing stick, mark the curve endpoints and midpoint. Bow the stick, sliding the toggle along the string until the curve touches the midpoint and both endpoints. Hold the stick firmly against the workpiece and trace the curve. When you're finished, release the tension on the stick.



Note: All holes are ⅛" diameter, located ¼" from ends of piece.

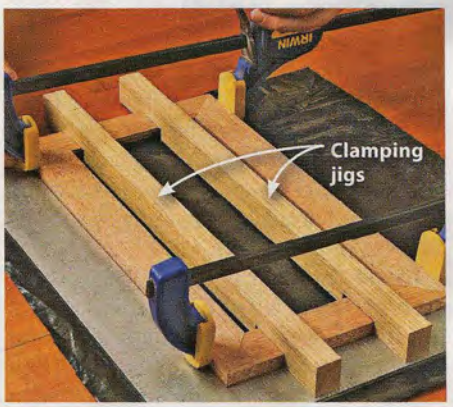
Add clamping jigs for less slip, more grip

Juggling two pairs of clamps to glue a mitered frame can end in frustration. With these jigs, however, one set of clamps squares the frame.



To make a pair, rip two pieces of ¾"-thick scrap ½" wider than the thickness of the frame parts and 3" longer than the frame sides, as shown *right*. Then install a ¾" dado blade, and adjust it to cut a dado ⅛" shallower than the thickness of the frame parts. With the jig pieces taped together on edge, cut dadoes where illustrated at *left*.

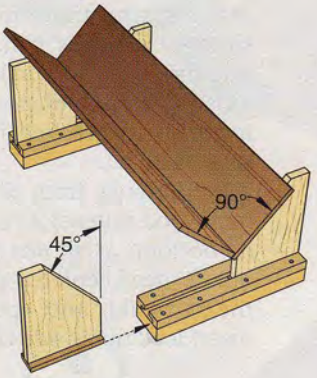
To use the jigs, glue the miters and assemble the frame flat on a workbench, aligning the corners with a framing square. (Protect the workbench with a plastic trash bag.) Position the jigs close to the inside corners, capturing the frame ends in the dadoes. Now clamp the frame sides, as shown *below*, while the jigs hold the short frame members in place.

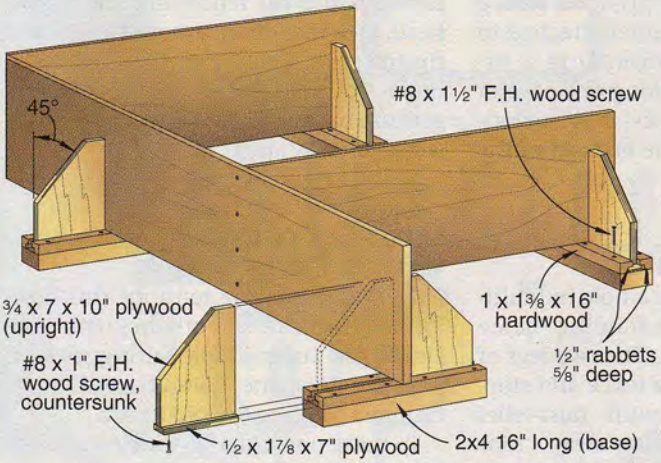


Case and Cabinet Accuracy Aids

6 Hold cabinet parts upright

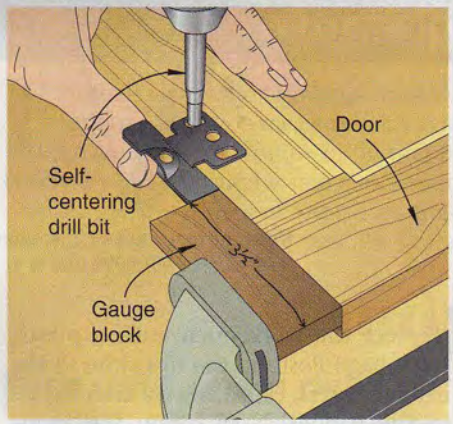
If you've tried standing cabinet parts on edge only to see them topple like a house of cards, check out these scrapwood workholders. Slide one of the two uprights into the base, prop a panel on edge against it, then slide the other upright against your workpiece to hold it while you assemble the project. You can flip the uprights around, as shown *right*, slide two together in the base, and use the angled edges to hold work at a 45° angle, when making a corner cabinet, for example.

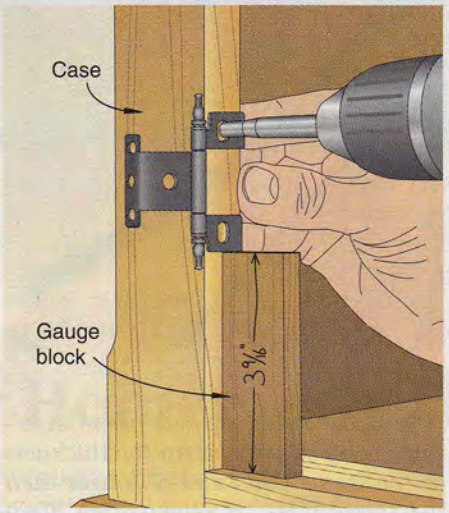



45°
#8 x 1½" F.H. wood screw
¾ x 7 x 10" plywood (upright)
#8 x 1" F.H. wood screw, countersunk
1 x 1⅜ x 16" hardwood
½" rabbets ⅝" deep
½ x 1⅞ x 7" plywood
2x4 16" long (base)

7 Turn scraps into gauge blocks and spacers

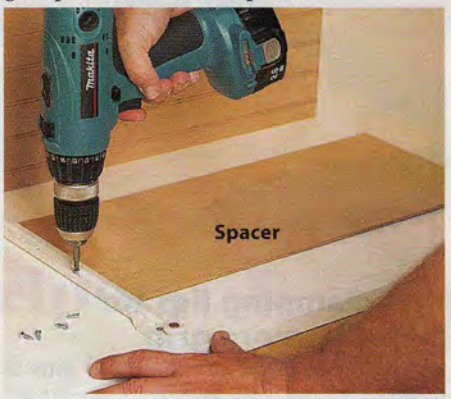
When mounting hardware, such as hinges and drawer slides, there's more than one way to ensure accuracy. To mount upper and lower hinges consistently on several doors, use a gauge block, as shown *below left*. You'll need one for the door frame and another that's 1/16" longer (to allow for the reveal) for the case frame, as shown *below*.





8

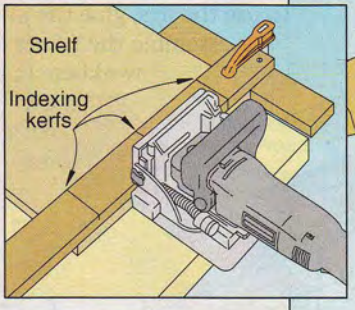
To accurately space drawer slides on both sides of a case, use a panel scrap. Start by cutting a scrap spacer for mounting the uppermost slides. Then drill mounting-screw holes, and attach the slides, as shown *below*. Now cut the spacer to length for the next highest group of slides, and repeat.

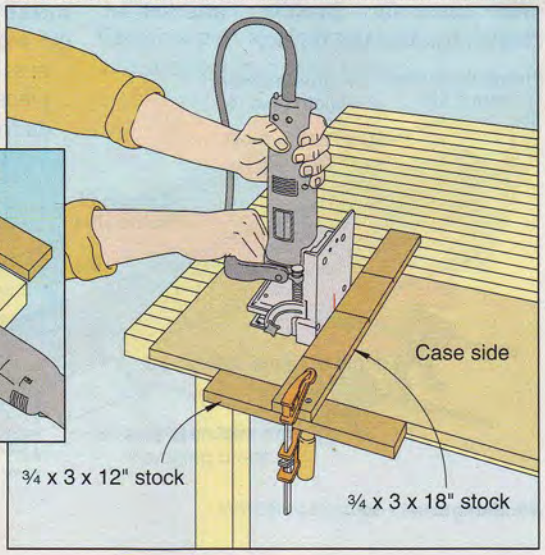


9 Make bookcase biscuits a breeze every time

Transfer biscuit locations accurately from a case side to a shelf end using this custom T-square. Assemble it from medium-density fiberboard (MDF) or melamine-covered particleboard scraps to make pencil marks easy to erase. Mark the biscuit location centerlines on the long leg of the square.

To use the square, clamp it to a shelf, as shown *right*, with the short leg against the front edge, and use the lines to cut biscuit slots on the shelf ends. Then clamp the square to the case side with the short leg against the front edge. Using the same centerlines, cut slots on the inside face of each case side.

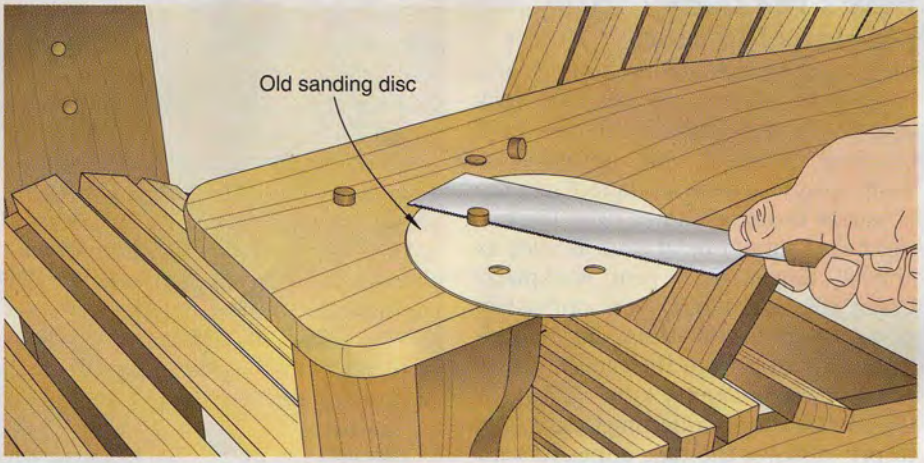




Goof Blockers

10 A close shave with no nicks

Wooden plugs provide easy concealment for screws, but cutting the plugs flush without marring the surrounding wood can be tricky. For a clean cut, reuse a worn-out sanding disc, as shown *right*. With the abrasive side down, slip the exposed plug through one of the holes in the sanding disc. Then saw the plug flush with the disc. There'll be a little extra left above the surface, but it's easier to sand that away than saw marks.



11 Scoring cut skips the chips

If both faces of a veneer plywood will be visible on your project, minimize chip-out on each side by dividing the cut. First make a shallow scoring cut 1/16" to 1/8" deep, as shown *below*. Then raise the blade, and make another pass to cut completely through the workpiece.

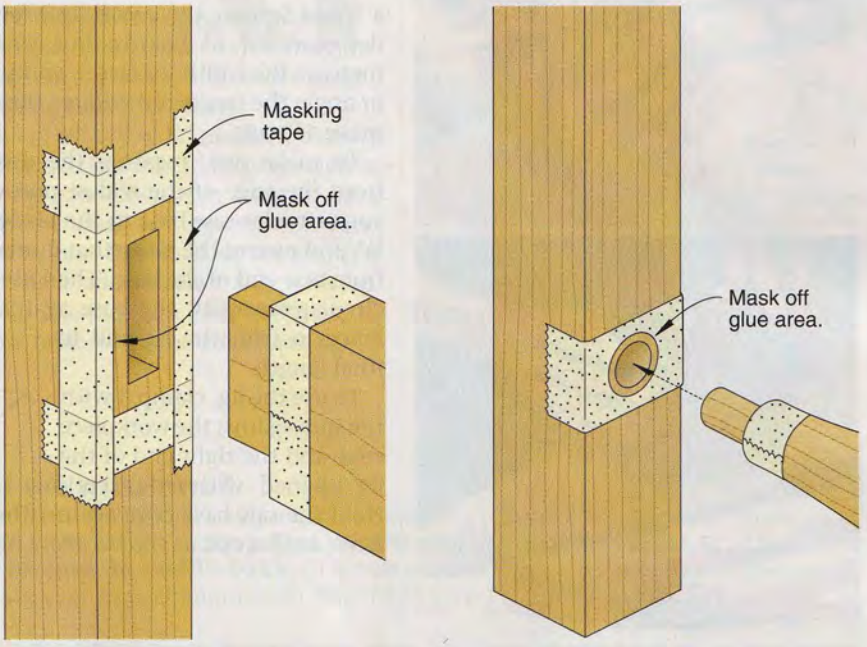
12 Trap glue squeeze-out

Glue globs and surface smears will mar a finish, especially when you're applying stain. Stop the problem before it starts on face-to-face joints by cutting 1/8"-deep saw kerfs about 1/8" from both edges, as shown *right*. Apply glue only between the kerfs and, as you press the two parts together, any squeeze-out will flow into the kerfs. If the ends will be visible in the completed project, use a table-mounted router and a 1/8" straight bit to make stopped grooves.

13 Keep glue smears from marring joints

Glue kerfs solve face-to-face glue-up problems, but mortise-and-tenon joints require another strategy. For joints like the one shown *right*, dry-assemble the joint, and tape the mortised piece around the tenon piece using masking tape or blue painter's tape. Then tape the tenon part next to the joint. Glue, assemble, and clamp the joint, making sure no squeeze-out drips off the tape.

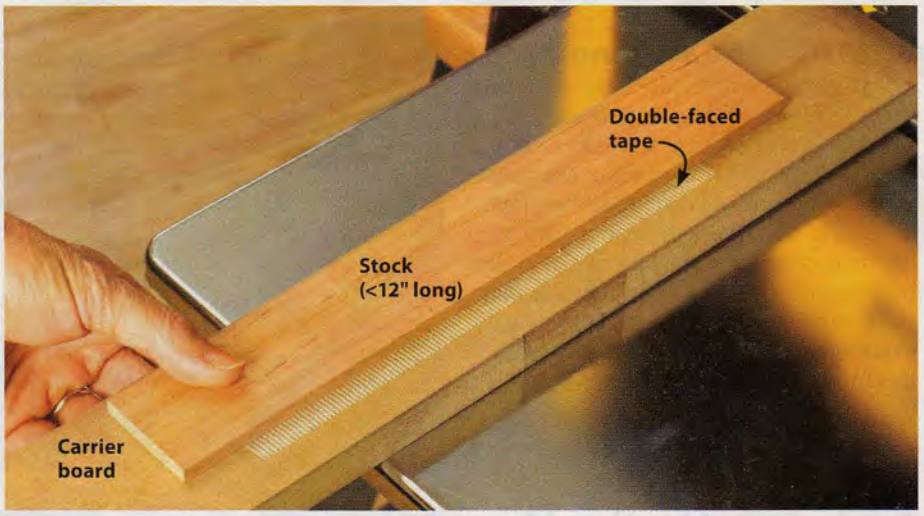
For dowel tenons in round holes, first tape over the mortise and cut away the tape over the hole, as shown *far right*. Insert the dowel or round tenon, and tape where it meets the surface of the mortised piece. Then glue and assemble the joint. In both instances, wait until the glue dries before pulling off the tape and finishing your project.



Problem-Solvers

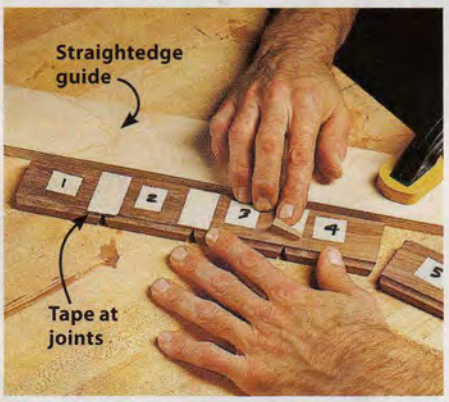
14 Here's the skinny on planing thin stock

Most planer manufacturers don't recommend planing stock less than ½" thick and 12" long because of the risk of it breaking. To safely work around these limits, piggyback the workpiece to a flat ¾" carrier board, as shown *right*. The carrier board should be at least as wide as and 2" longer than your workpiece. Using this technique, you can safely plane wood to 1/16" thick. To remove wood that thin from the carrier, gently pry it off using a putty knife starting at the ends. If the piece becomes too fragile to pry, dissolve the tape adhesive with lacquer thinner.



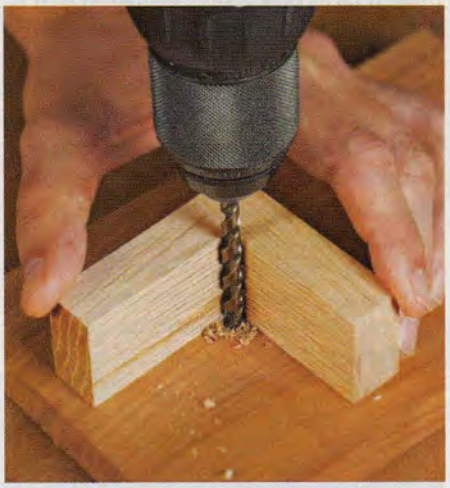
15 Tape your way to tight glue joints

Assembling boxes with more than four sides presents a clamping challenge. Here's an easy alternative: First lay out the box pieces with the top or bottom edge against a straightedge and the outside corners touching. Use masking tape to pull the outside edges tightly together, as shown *below top*. Next apply glue, and roll the segments around the base, as shown *below*. Tape the beginning and end segments, apply pressure with a band clamp, if necessary, and allow the assembly to dry on a flat surface.



16 Make a portable drill as accurate as a drill press

Even if you own only a portable drill or your drill-press table can't accommodate a large workpiece, you can drill 90° holes using this easy-to-make right-angle jig. Build one by joining two scrap blocks at 90°. Place the tip of the bit where you want the hole, slide the jig against the bit as you straighten it, and bore your perpendicular hole, as shown *right*. If you need to drill deeper than the right-angle jig allows, drill the hole as far as possible using the jig, remove the jig, and drill further, guided by the hole already drilled.

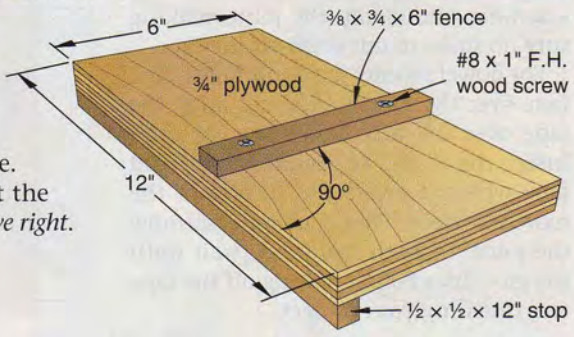


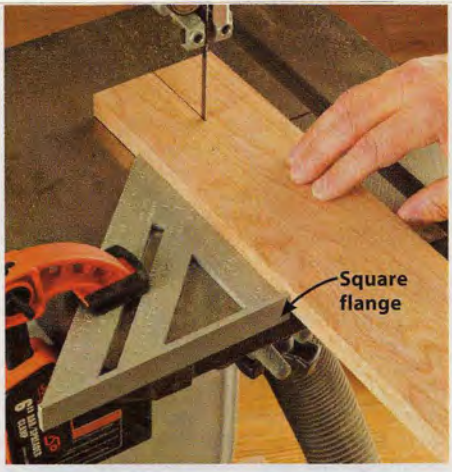
17 Make on-the-mark cuts with your circular saw

Faster to set up and more accurate than a Speed Square, the cutoff jig *below* was designed for 6" boards. But you can increase the width for larger workpieces, or angle the fence and enlarge the jig to make 45° cuts.

To make one, measure the distance from the edge of the widest portion of your circular-saw base to the blade, add ¼", and mount the fence that dimension from one end of the base. Then use your circular saw with the base against the fence to trim the jig end to final length.

To use the jig, clamp it with the stop against the workpiece edge and the right end of the jig aligned with your cutline. Hold the saw-base edge against the fence as you cut, as shown *above right*.





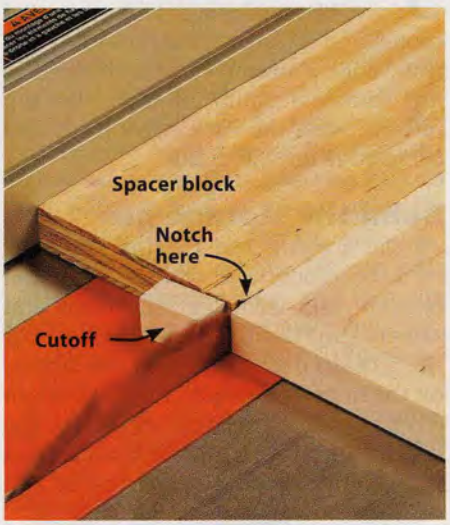
18 Square makes a fast fence

If your bandsaw didn't come with a fence, substitute a Speed Square. With the square's flange against the front edge of the bandsaw table, clamp it in place where you want to begin your cut. These squares cost only a few dollars, and their thickness provides enough edge to guide workpieces lying flat.

19 Give solid edge bands that clean-cut look

Trimming solid-wood edge bands on plywood shelves can leave handsaw scratches or rounded edges from sanding. Instead make a spacer block with parallel edges. Then set your tablesaw fence to remove just a whisker more than the blade width from the end of one edge.

Without moving the fence, lay the spacer block between the fence and a piece of test scrap. Push both a couple of inches into the blade. If the scrap touches the blade, move the fence a hair closer to the blade, and make a second test cut. Once the scrap clears the blade, place your shelf edge against the spacer block, as shown *below*, and push both just far enough into the blade to remove the edge banding. Sand off any that's left.

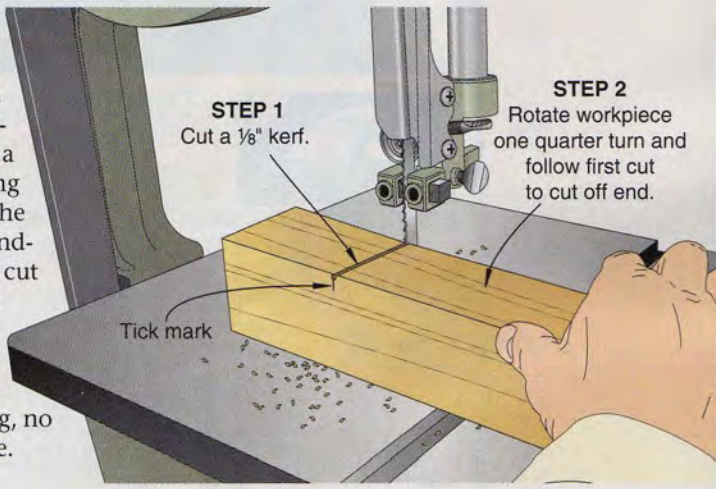


20 Cut big panels down to size

Wrestling with 4×8 panels in a small shop can be a losing battle. Here's a way to cut them before taking them into your shop. First make a straightedge using the factory-cut edge of a 10"-wide scrap of plywood or medium-density fiberboard. Next lay the panel on a sheet of rigid foam insulation at least 1" thick. Measure from the saw-base edge to the blade, and clamp your straightedge that distance from the cutline. Clamp the guide in place; set the blade cutting depth to penetrate ¼" into the foam insulation, and then make the cut, as shown *right*.

21 Cut to the chase

Here's a quick, accurate way to make a freehand squaring cut on your bandsaw, as you would for a turning blank. After making a tick mark to indicate the cutline, and with your bandsaw table 90° to the blade, cut a shallow kerf at your tick mark. Then rotate the stock a quarter turn so the kerf is on top, and cut along the kerf—no drawing, no square, and no miter gauge.



22 Rip thin stock safely with a zero-clearance tabletop

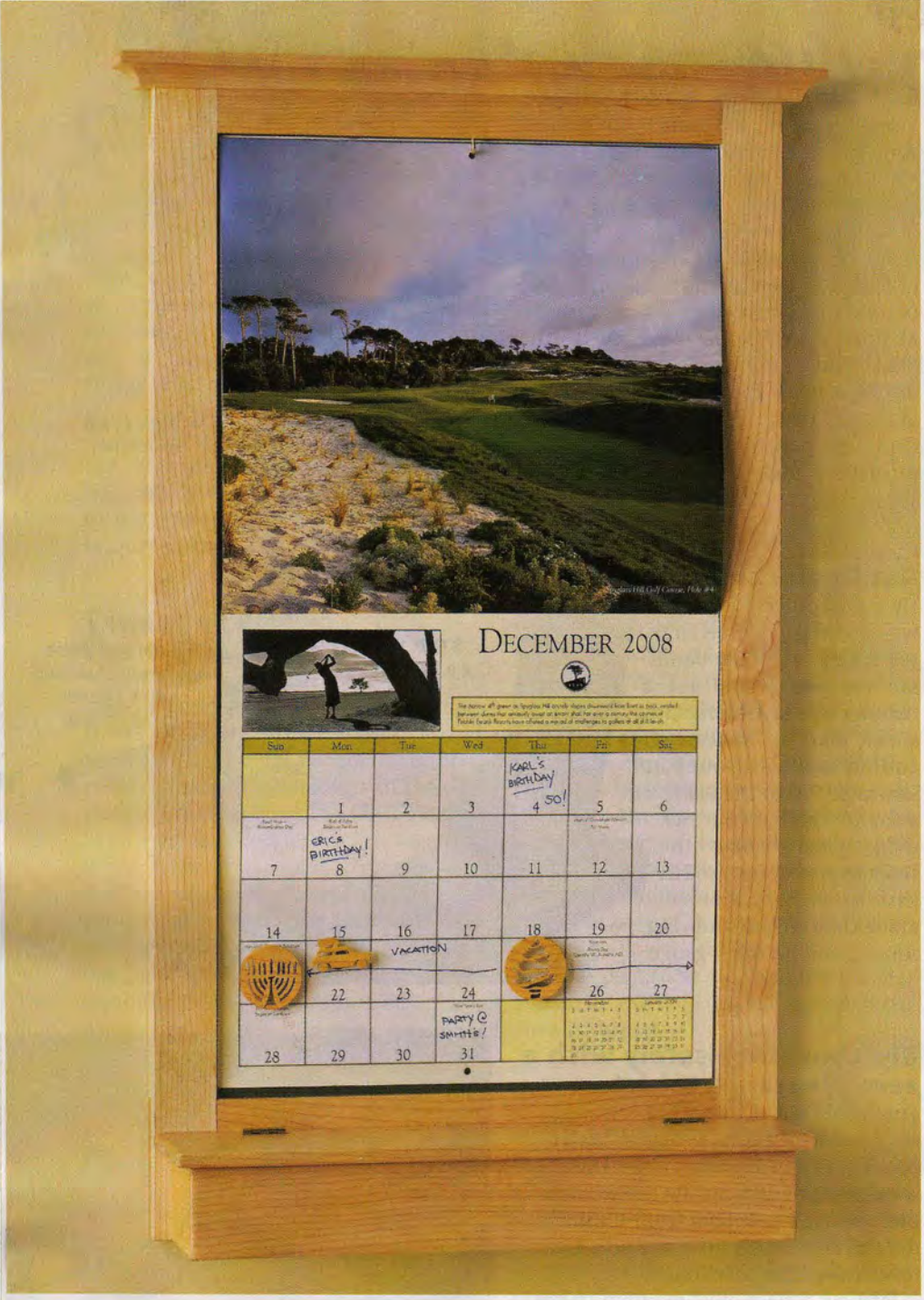
You'll cut thin stock with less tear-out on a saw with a zero-clearance insert. But there's an easier way to get the same results while raising the workpiece enough to keep it from sliding under the fence. This tip also works great for cutting thin sheet brass.

First cut a piece of ¼" medium-density fiberboard or hardboard large enough to cover the saw table from front to back and wide enough to support your workpiece. Position the fence for the cut, and lower the blade beneath the tabletop. Then double-face tape the hardboard to the saw table with one edge against the fence.

Start the saw and gradually raise the blade through the zero-clearance top to the correct height. Always use pushsticks to control stock narrower than 2".

Did we miss one?

Do you know a tip that's as good as or better than these? If so, send your tip and contact information to **Shop Tips, *WOOD* magazine, 1716 Locust St., LS-221, Des Moines, IA 50309-3023**. Or e-mail us at shoptips@woodmagazine.com and include your contact information. You might earn $100 or a valuable tool prize.



Calendar Keeper

Make any calendar look right at home in this simple but elegant frame.

No matter how beautiful its photographs, a calendar invariably looks "tacked up" when stuck to a wall or refrigerator. This frame solves that problem, with style to spare. To ramp up the fun factor, it includes a variety of scrollsawn magnet-backed icons for marking family holidays and events. They stick to a steel plate behind the calendar.

Mark important dates and events with magnetic scrollsawn icons. They store in a hinged compartment below the calendar.

First, make the frame

We sized our frame to fit a 12×11" calendar that measures 12×22" when open. Find your calendar, measure it, and adjust any part sizes as necessary before you start building.

1 Cut the frame stiles (A), top rail (B), and bottom rail (C) to size [**Materials List**, *page 70*], as well as some scrap stock matching the thickness of the stiles and rails. Install a ¾" dado set on your tablesaw and adjust its height to cut half-lap joints, testing your settings in the scrap. After installing an auxiliary face on the rip fence, cut 1" rabbets at one end of the stiles [**Drawing 1**]. Reset the fence and cut 3¼" rabbets at the other end of the stiles. Reposition the fence again, and cut 1½" rabbets on both ends of the top and bottom rails. Glue and clamp the frame, and remove any glue squeeze-out [**Photo A**].

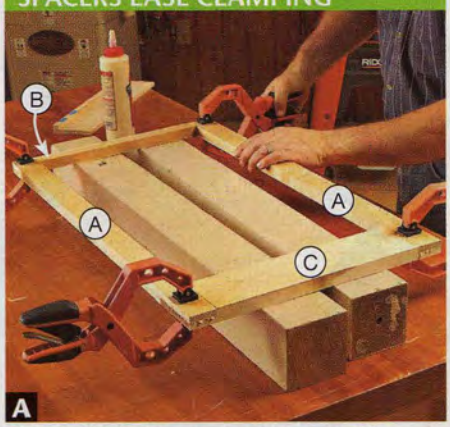
2 Rout a ¼" rabbet ½" deep on the inside edge of the back face of the frame assembly (A/B/C). To reduce tearout, cut the rabbet in progressively deeper passes until reaching the final depth. Square the corners of the rabbet [**Photo B**], then finish-sand the frame.

3 Cut the top (D) to size. Chuck a ½" cove bit into your table-mounted router, and form a cove on the ends and front edge [**Drawing 1**]. Finish-sand the top. Glue and clamp the top to the top rail (B), with the back edges flush and centered from side to side.

Build the storage box

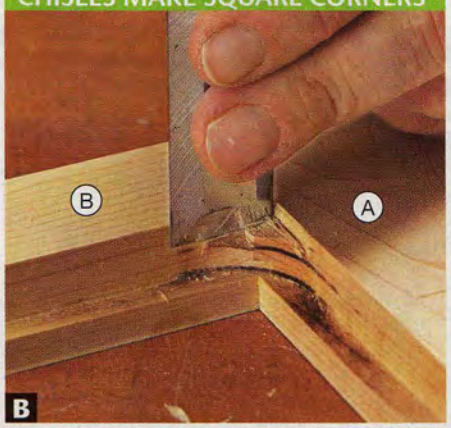
1 Cut a blank 2⅝×35" from ⅜" stock for the box front (E), sides (F), and bottom (G). Then, cut the front and sides to length and final width. Machine the grooves in the sides and the rabbets on the front [**Drawing 2**]. Cut the bottom (G) to length. Now, glue and clamp the box together, with the ends and edges flush. Remove any glue squeeze-out, and set aside to dry.

SPACERS EASE CLAMPING



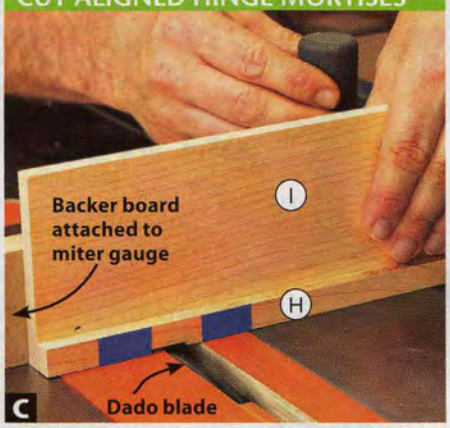
Elevate the frame on spacers to provide clamp clearance. Glue and clamp the frame, checking for square.

CHISELS MAKE SQUARE CORRECTS

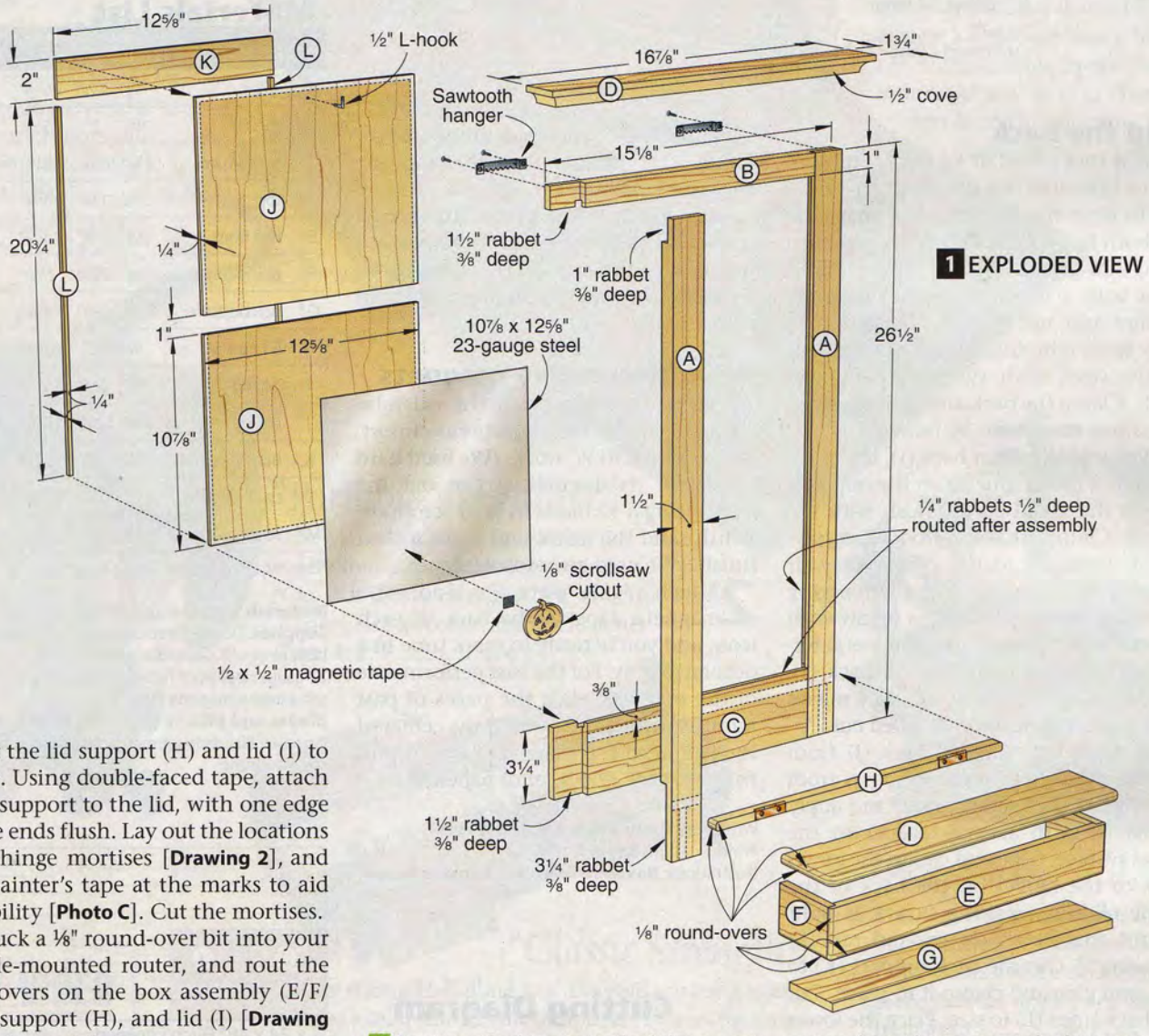


Use a sharp chisel to square up the rabbeted corners. Take small bites with the chisel for the cleanest results.

CUT ALIGNED HINGE MORTISES



To cut the hinge mortises, use a dado blade, and attach a backer board to your miter gauge to prevent tear-out.



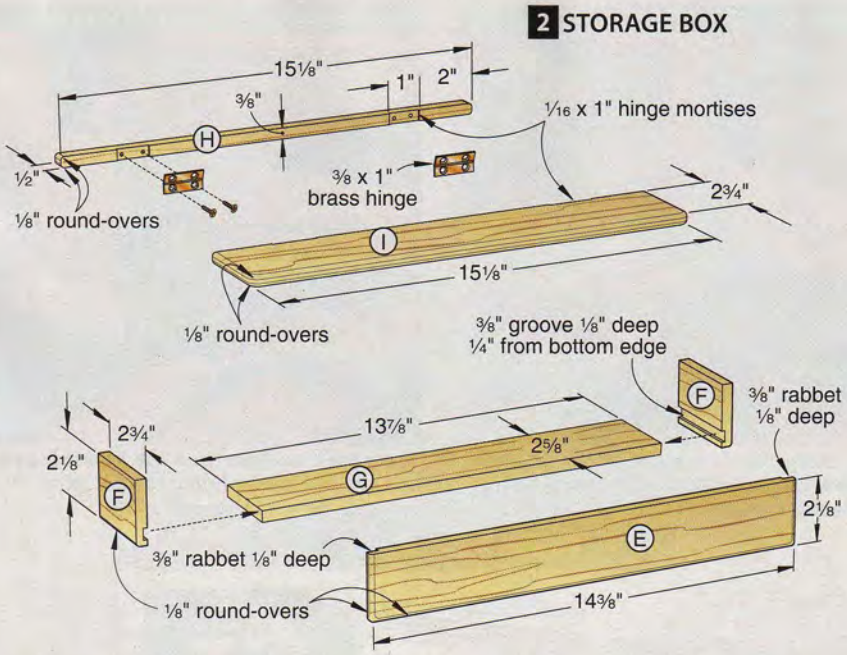
1 EXPLODED VIEW

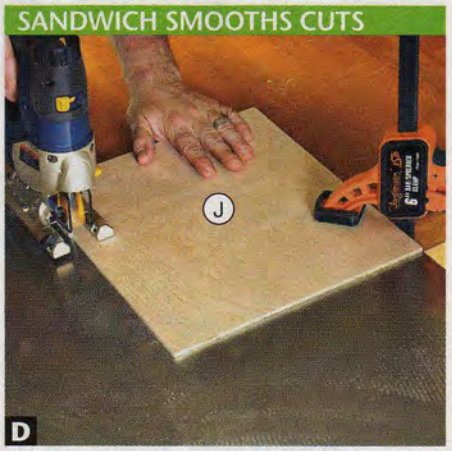
2 Cut the lid support (H) and lid (I) to size. Using double-faced tape, attach the lid support to the lid, with one edge and the ends flush. Lay out the locations of the hinge mortises [**Drawing 2**], and place painter's tape at the marks to aid in visibility [**Photo C**]. Cut the mortises.

3 Chuck a ⅛" round-over bit into your table-mounted router, and rout the round-overs on the box assembly (E/F/G), lid support (H), and lid (I) [**Drawing 2**]. Finish-sand the parts.

4 Glue and clamp the box assembly (E/F/G) to the bottom rail (C) and stiles (A). Center the box from side to side, with the bottom edges flush.

5 Position the hinges in the lid-support (H) mortises, with the leaf flush with the bottom edge. Mark and drill 5/64" pilot holes. Repeat this procedure for the lid (I). To prevent breaking the soft brass screws later, first mount the hinges using #4 steel screws. Remove the hinges, and glue the lid support to the box assembly (E/F/G), with their back edges flush. Set the lid aside for now.





To cut the metal backer, sandwich it between the two backs (J), and clamp the pieces to the workbench. Cut along the plywood edge.

Add the back

1 Cut two pieces of ¼" birch plywood to 12⅝×10⅞" for the backs (J).

2 To form the metal backer, first sand both faces of a piece of 23-gauge steel using 320-grit sandpaper. Clean the surfaces with acetone to remove any oily residue and metal dust. Using heavy-duty spray adhesive, attach one back (J) to the steel, with two adjacent edges flush. Clamp the back and steel together, and allow to cure for 30 minutes.

3 Retrieve the other back (J), and position it (don't glue it) on the opposite side of the metal backer flush with the edges. Clamp this plywood/steel/plywood sandwich to the corner of your workbench, with the steel overhanging the edges [**Photo D**]. Using a jigsaw with a metal-cutting blade, cut the metal following along the edge of the back (J). Sandwiching the metal this way makes for a smoother, more controlled cut.

4 Remove the unglued back (J) from the sandwich. Sand any burrs from the edge of the metal backer, and apply a coat of satin aerosol lacquer to the metal surface. Glue and clamp the upper back to the rabbet on the back of the frame (A/B/C), making sure it is tight against the rabbet on the top rail (B) [**Drawing 1**]. Cut the back support (K) to size, and glue and clamp it in place. Cut the back stops (L) to size. Place the lower back (J) into the rabbet, with the bottom edge tight against the rabbet in the bottom rail (C), leaving a gap between the two backs. Glue and clamp the back stops in place.

5 Finish-sand, and apply three coats of aerosol lacquer, lightly sanding between coats with a 320-grit sanding sponge. Reattach the hinges using brass screws, and add the sawtooth hangers to the back of the top rail (B) [**Drawing 1**]. To hold your calendar in place, screw in a ½" L-hook.

Next: decorative magnets

1 Make a photocopy of the calendar icons in the *WOOD Patterns*® insert, and adhere it to ⅛" stock. (We used hard maple for its durability.) Cut out the icons using a #2 blade in your scrollsaw. Finish-sand the icons, and apply a clear finish. (We used an aerosol lacquer.)

2 Attach a ½×½" piece of self-adhesive magnetic tape to the back of each icon, and you're ready to mark time in a decorative way. For the best performance of the magnets, slide the pages of past months through the slot in the center of the frame so the magnets have to pull through only one layer of paper.

Written by **Kevin Boyle** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

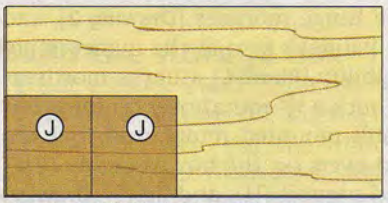
Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	stiles	¾"	1½"	26½"	M	2
B	top rail	¾"	1"	15⅛"	M	1
C	bottom rail	¾"	3¼"	15⅛"	M	1
D	top	¾"	1¾"	16⅞"	M	1
E*	box front	⅜"	2⅛"	14⅜"	M	1
F*	box sides	⅜"	2⅛"	2¾"	M	2
G*	box bottom	⅜"	2⅝"	13⅞"	M	1
H	lid support	⅜"	½"	15⅛"	M	1
I	box lid	⅜"	2¾"	15⅛"	M	1
J	backs	¼"	12⅝"	10⅞"	BP	2
K	back support	¼"	2"	12⅝"	M	1
L	back stops	¼"	¼"	20¾"	M	2
M*	scrollsaw blank	⅛"	2"	20"	M	1

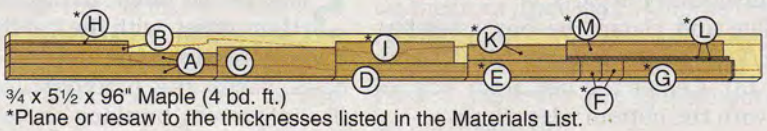
*Parts initially cut oversize. See the instructions.

Materials key: M–maple, BP–birch plywood.
Supplies: Double-faced tape, spray adhesive, ⅜x1" brass hinges (2), sawtooth hangers (2), 10⅞×12⅝" 23-gauge steel, #4×1" flathead wood screws, ½" L-hook, self-adhesive magnetic tape.
Blades and bits: ⅛" round-over, ½" cove, and rabbeting router bits; dado set; metal-cutting jigsaw blade; #2 scrollsaw blade.

Cutting Diagram



¼ x 24 x 48" Birch plywood



¾ x 5½ x 96" Maple (4 bd. ft.)
*Plane or resaw to the thicknesses listed in the Materials List.

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ART DECO DESK CLOCK

We all have 'em: wood scraps too little to be of much use, but too beautiful to toss out. Now you can fashion those exotic or figured castoffs into a handsome timepiece.

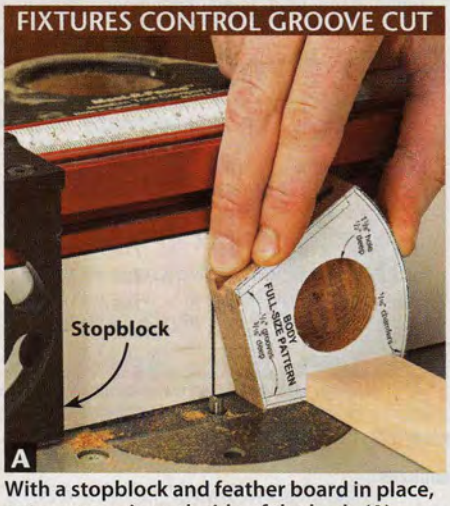
Form the body and wings

1 Cut a ¾×3¼×3" blank for the body (A). (We used lacewood and curly maple for the clock *above*, and spalted maple and walnut for the one *opposite, top*.) Photocopy the **Body Pattern** from the *WOOD Patterns*® insert, and adhere it to the blank with spray adhesive, aligning the bottom edge of the pattern flush with the end of the blank.

2 Using a 1⅜" Forstner bit in your drill press, bore a hole ⅜" deep in the body (A) where marked on the pattern.

3 Bandsaw or scrollsaw the body (A) to just outside the pattern lines, then sand the edges to the lines.

4 To cut the stopped grooves on the sides of the body (A), install a ¼" straight bit in a table-mounted router. Adjust the fence to center the bit in the ¾" stock. Now set a stopblock so when the body is pushed across the bit, it stops at the indicated mark on the pattern [**Photo A**]. Rout the grooves on both sides of the body.



With a stopblock and feather board in place, cut a groove in each side of the body (A). Slide your hand on top of the fence for safety.

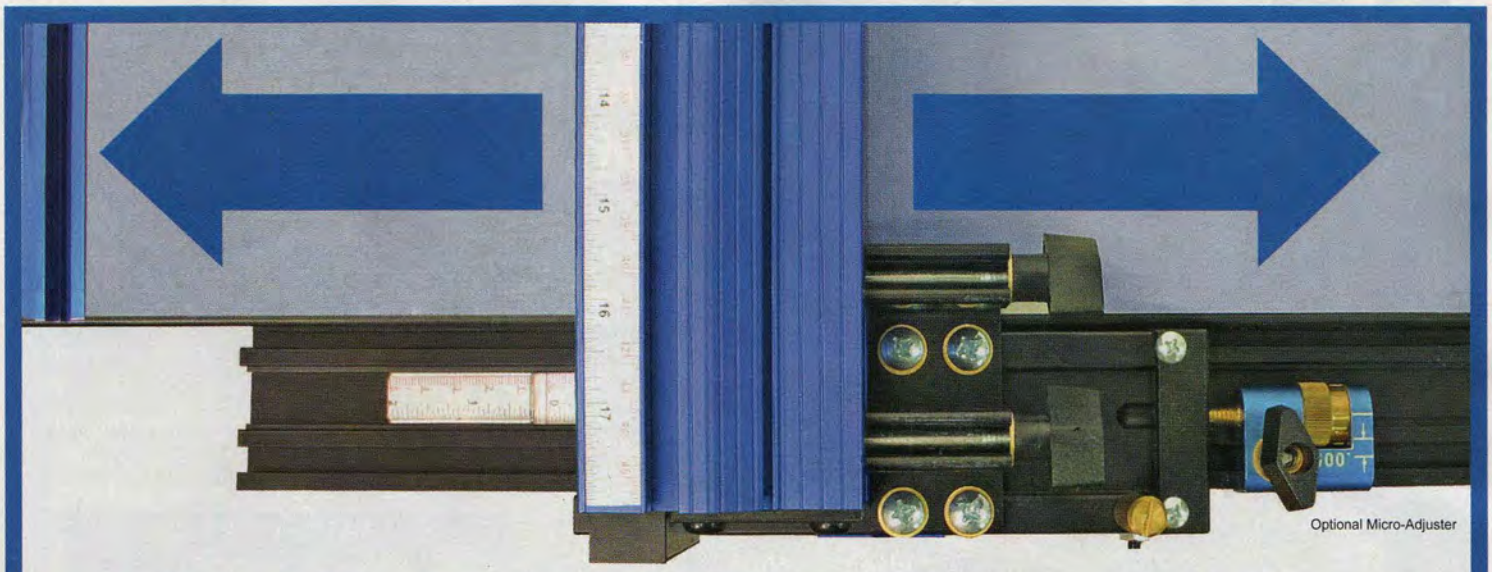
5 Using a 45° chamfer bit in your table-mounted router, cut a 1/16" chamfer around the front and back faces of the body (A) [**Photo B**]. (You'll use the same setup to chamfer the base [C] shortly.) Remove the pattern, and finish-sand the body to 220 grit.

6 Cut two ¼×1¾×3¼" blanks for the wings (B). Make two copies of the **Wing Pattern** and adhere one to each blank, with the long, straight edge of the pattern flush with the edge of the blank. Bandsaw or scrollsaw the wings to shape, then sand away any saw marks on the cut edges. Remove the pattern, and finish-sand the wings to 220 grit.

Now make the base

1 Cut a ¾×2¼×10" blank for the base (C). Resaw the blank to ⅝" thick. (We used a tablesaw.) Then crosscut the blank to 6".

continued on page 76



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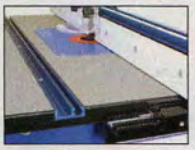

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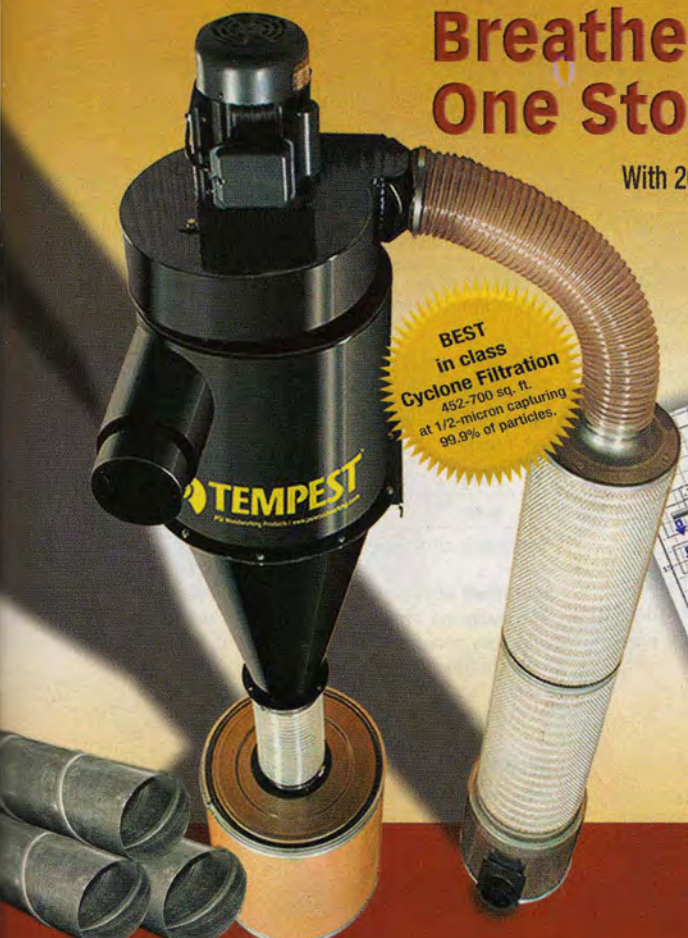

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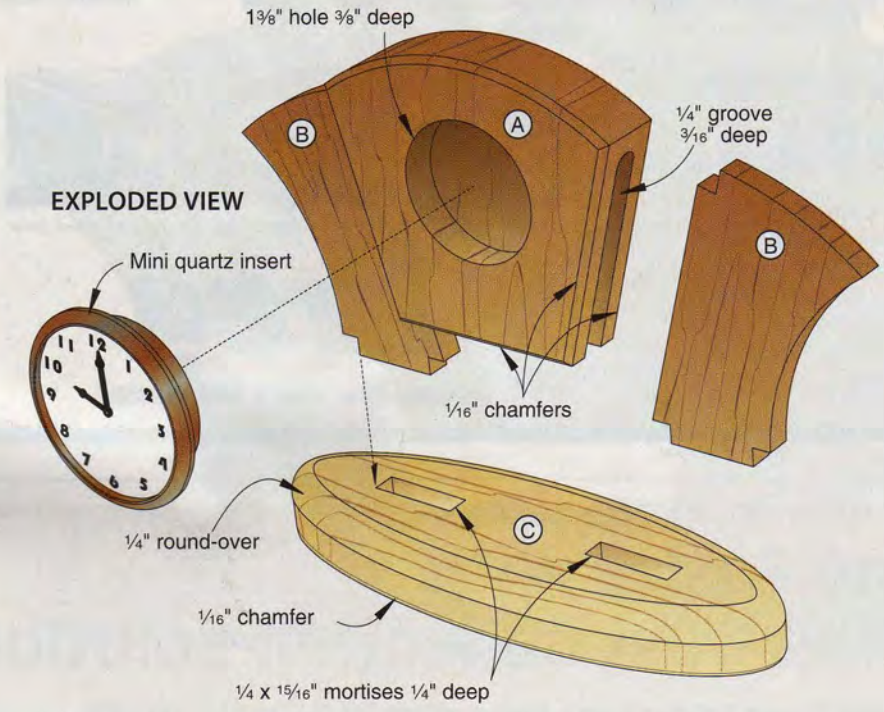
Contrasting species highlight the clock's shapely figure. Here we chose spalted maple and walnut for a blond-over-brown variation.

Use a starter pin and a push pad for safety when freehand routing the chamfers on the front and back of the body (A).

With the base aligned to cut the mortises, lock the drill-press fence in place, and drill overlapping holes with a Forstner bit.



2 Photocopy the **Base Pattern** and adhere it, centered, to the blank.

3 To form the mortises in the base (C) to receive the wings (B), chuck a ¼" bit in your drill press. We prefer the flat bottoms produced by a Forstner bit, but a brad-point bit also will work. Adjust your drill-press fence to center the bit over the marked mortises on the pattern.

4 To make the mortises, drill overlapping holes ¼" deep in the base (C) where shown on the pattern [**Photo C**]. Use a chisel to clean up the edges and square the corners of the mortises. Bandsaw or scrollsaw the base to shape.

5 Rout the 1⁄16" chamfer on the bottom of the base (C) using a starter pin, as you did earlier. Change to a ¼" round-over bit, leave the starter pin in place, and rout the top of the base. Remove the pattern, and finish-sand to 220 grit.

Assemble and finish

1 Apply glue to the grooves in the body (A), and insert the wings (B). To hold the parts in position, use masking tape as a clamp. Next apply glue to the mortises in the base (C), insert the body and wing assembly (A/B) into the base, and clamp.

2 After the glue dries, apply a clear finish. (We sprayed on three coats of aerosol satin lacquer, sanding between coats with a 320-grit sanding sponge.)

3 Install the clock movement, put the clock on your desk, and enjoy watching time pass.

Written by **Jeff Mertz** with **Kevin Boyle**
Project design: **Matt Seiler**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Cutting Diagram

¾ x 3½ x 12" Lacewood (.33 bd. ft.)

¾ x 2¼ x 10" Maple (.21 bd. ft.)
*Plane or resaw to the thicknesses listed in the Materials List.

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A*	body	¾"	3¼"	2¾"	C	1
B*	wings	¼"	1 11⁄16"	2⅞"	C	2
C*	base	⅝"	2"	5½"	C	1

*Parts initially cut oversize. See the instructions.

Materials key: C–choice of contrasting woods, such as curly maple and lacewood, curly maple and walnut, ash and cherry, or curly maple and ash.
Supplies: Spray adhesive.
Bits: ¼" and 1⅜" Forstner bits; 45° chamfer, ¼" round-over, and ¼" straight router bits.

Source

Mini quartz movement: White Arabic Dial with Chrome Bezel no. 15267, $7.49 ea. from Klockit (800-556-2548, klockit.com).

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Is my benchtop saw biting off more than it can chew?

Q: I have a 1-hp benchtop tablesaw with a 40-tooth carbide-tipped blade. When I tried to rip a 2×4, I had to feed the wood slowly to keep the saw from bogging down and tripping the breaker. But the slow feed rate made the wood smoke. Am I feeding this saw more than it can handle?

—Scott Taylor, Goddard, Kan.

A: There's no reason that a properly tuned and outfitted benchtop tablesaw can't easily rip 2×4s, Scott. You can do a few things to improve your saw's performance, however. First, trade out the 40-tooth blade for a 24-tooth, thin-kerf blade made for ripping. Fewer teeth make for easier chip ejection and cooler cuts. A thinner blade removes less wood, putting less strain on the motor and helping it maintain its rpm. With the blade installed, adjust it and the fence parallel to the miter slot. Burning often can be traced to a misaligned blade or fence pinching the wood.

Finally, leave that splitter and blade guard installed, as shown *right*. Pine 2×4s may have internal stresses that cause them to pinch the blade during rip cuts—exactly the problem your splitter was meant to cure.

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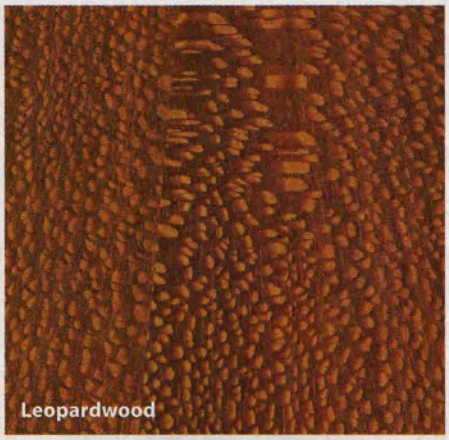
Confused by lookalikes leopardwood and lacewood

Q: The July 2008 issue of *WOOD*® magazine shows leopardwood on page 65 and lacewood on page 44. They look similar to me, and I've seen each labeled both ways in hardwood stores. If they are different species, how do I tell them apart?

—Roy Galbreath, Diamond, Ill.

A: Leopardwood and lacewood are indeed two distinct species, Roy, though people (even hardwood dealers) often confuse them with one another. Use these characteristics to tell the two apart: Both leopardwood, *below*, and lacewood, *bottom*, display flecks caused by rays that bisect the growth rings. But leopardwood's flecks tend to be splashy and round (like a leopard's spots), where lacewood's appear wispy, coming to a point on both ends. With a pinkish-brown to chocolate-brown color range, leopardwood weighs in as the denser and darker of the two woods. Lacewood has a light-pink to light-brown color and a sheen that makes it appear to glow.



Leopardwood

Lacewood

continued on page 80

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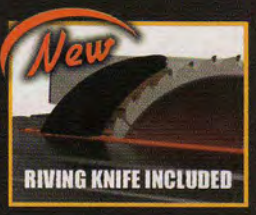

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Watermarked walnut woes

Q: A recent basement flood left a dark "waterline" on some walnut frames that were waiting to be finished. Is there a way to erase the blemish?

—Beth Krehbiel, Deer Creek, Okla.

A: If there is no damage, such as swelling or spreading joints, you might have gotten lucky, Beth. Try this: Re-sand all the surfaces through 80, 120, 180, and 220 grit, paying special attention to the watermarked areas. This should remove most of the surface stain and knock down any raised fibers. Then, wipe on a generous coating of boiled linseed oil. Allow it to penetrate for 5–10 minutes before wiping it off with a paper towel. For dark woods, like your walnut, the penetrating finish blends any remaining stains into the wood grain.

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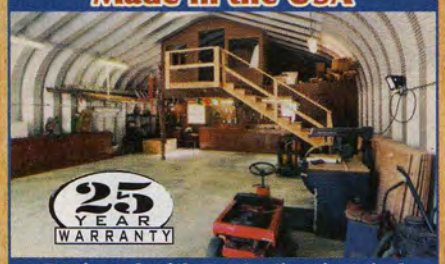

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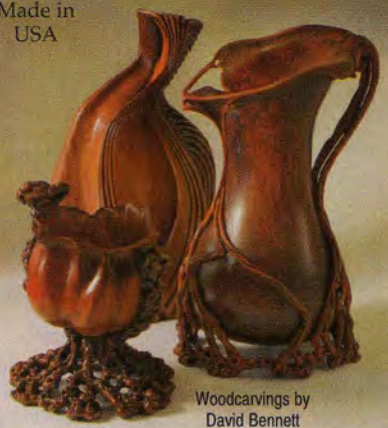

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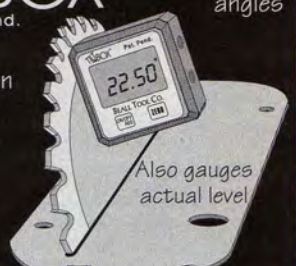

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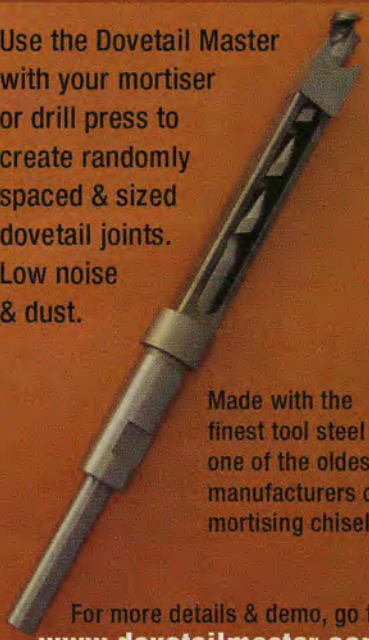

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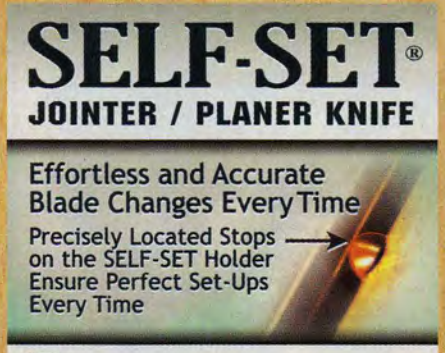

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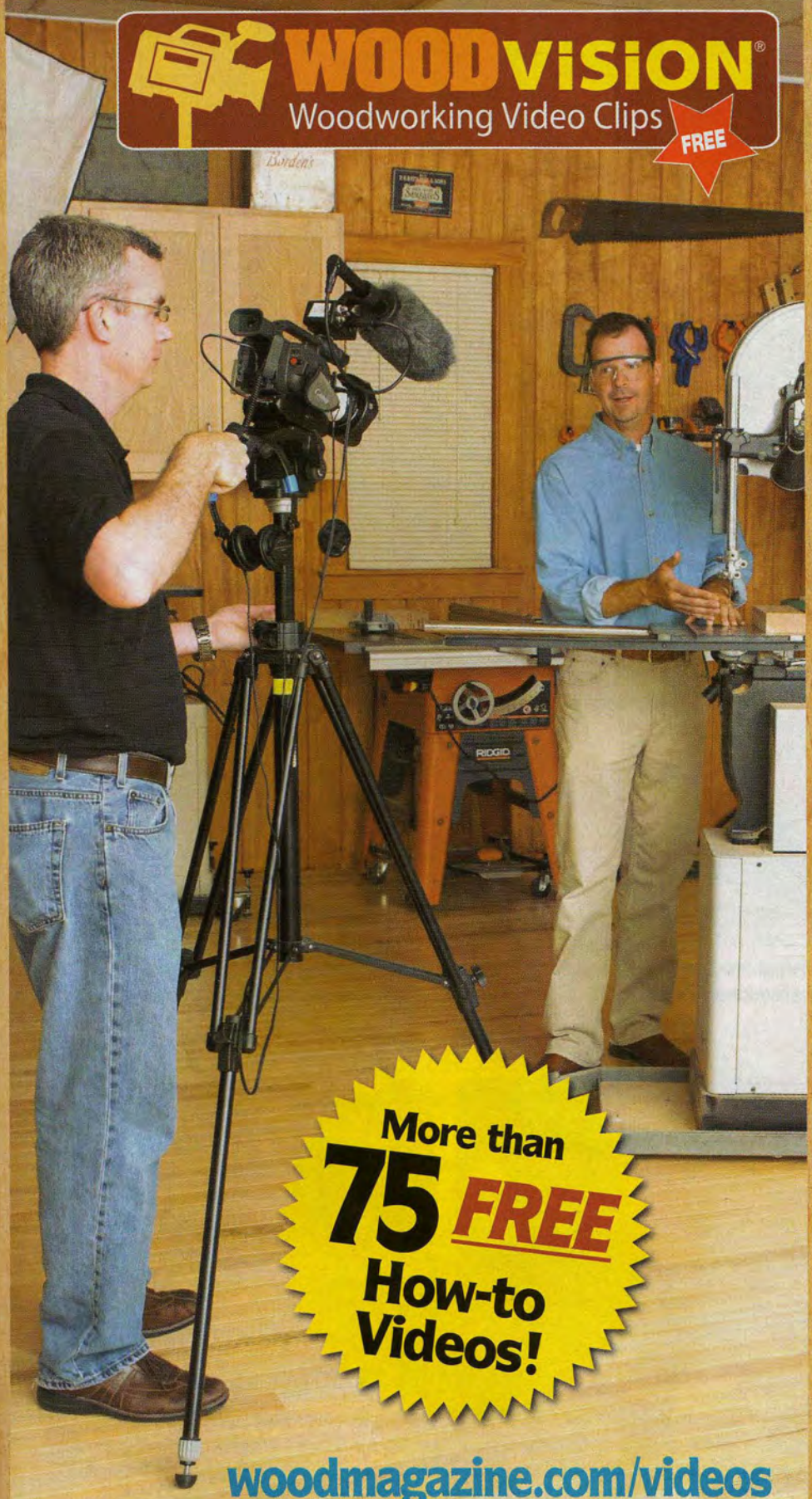

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What's Ahead

A sneak peek inside the December/January 2008/2009 issue (on sale November 18)

FEATURED PROJECT

Cherry dresser

This beautiful six-drawer chest matches the pencil-post bed and nightstand in this issue (*pages 24–31* and *36–39*). You'll also find complete instructions for the dresser-top valet and wall mirror shown.

Basic-Built three-table set

You can't build matching tables any simpler than this. All three pieces have the same parts that vary only in length.

Wine holder

Keep up to six bottles of wine at hand for dining or entertaining with this countertop rack. Straightforward joinery and full-size patterns for most parts make it a cinch to build.

TOOL TEST

6" Stacked dado sets

Most of us cut dadoes less than an inch deep, so a 6"-diameter set will handle all our needs—and save money over an 8" set. Find the blades that best meet your needs.

Consistent color on plies and solid wood

There's more than one way to get even stain color on sheet-goods veneers and adjoining solid woods. We'll show you three of them.

Making woodworking your business

Interested in earning a living from your time in the shop? Learn the ins and outs from this former accountant who now turns bowls full-time.

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